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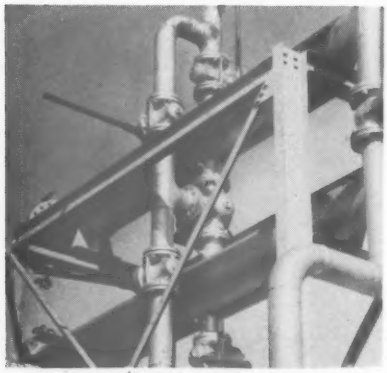

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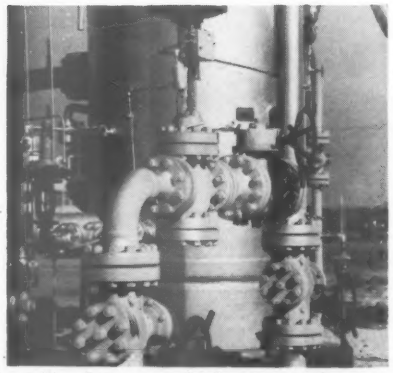

Nordstroms on high pressure lean oil lines to absorber.

the OIL AND GAS JOURNAL

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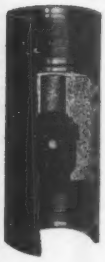

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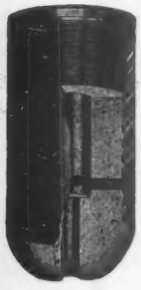

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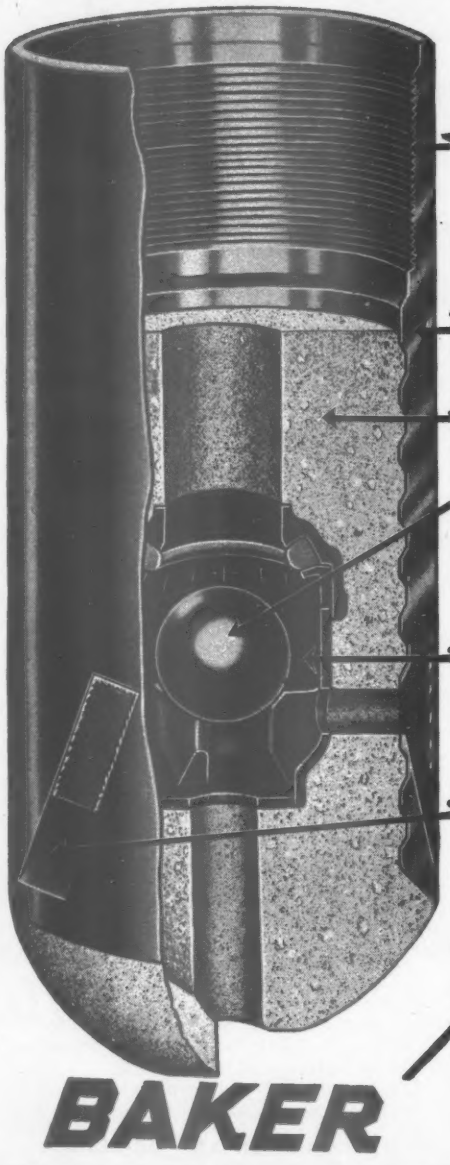

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THE OIL AND GAS JOURNAL

Passing of Flares

THE story is told that a writer recently assigned to prepare an oil article for a national magazine observed that the romance and fascination of the fields she had found in visits of a few years ago had disappeared. Her complaint when analyzed revealed that she missed the disorder and confusion of new pools and particularly the flares lighting the fields.

This author and others seeking the so-called glamour in old and new operations—so necessary in popular descriptions—are certain to have less and less to write about. The essential part that conservation plays in efficient field operations has permanently ended those unusual activities.

The gradual passing of the flares is a reflection of orderly field activities. Operators have always regretted the dissipation of gas, a byproduct of a situation in which rapidly expanding consumption of petroleum had to be met, coupled with the fact that there were no commercial demands for the gaseous hydrocarbons. The extraction of the liquid fractions from the casinghead gas was the initial development in the reduction of this loss.

Utilization of all the residue gas is the current problem. Pressure maintenance and the repressuring of older fields with gas has been a major conservation development increasing the recoveries from flush and settled fields and reducing lifting costs. The manufacturing arts in liquefaction of gas are advancing rapidly.

These operations still leave substantial quantities of gas for which there are no demands within the fields. It is this excess supply for which the producers are now seeking to find outlets.

Once again operators are solving the unsolvable. Plans announced over the past month involving expenditures of many millions of dollars will gather and transport excess gas from operations which otherwise would be blown into the air. Other programs are in the making.

There are, of course, limits to what oil operators can do in disposing of gas not required in field operations. Future activities are contingent on the returns for the gas delivered to transporters and distributors.

The position of natural-gas companies, in turn, is largely dependent on the attitude of the Federal Power Commission and the state public-utility bodies in regard to consumer schedules. It is agreed that an advance of a few cents per thousand cubic feet of gas carried back to the fields would end practically all waste. The exceptions would be the areas of exceptionally small residue output and operations far removed from the markets.

Operators have shown their willingness to place crude oil and gas production on the same basis in regard to the elimination of physical waste. A realistic attitude on the part of utility agencies is all that is now required to accomplish this final step in field conservation practices.

OPA Hikes Residuals 21 Cents; 15 Cents in Western Area

WASHINGTON.—Ceiling prices on residual fuel oils both industrial and Navy grades were increased by the Office of Price Administration by 21 cents per barrel in all areas except Washington, Oregon, California, Nevada, Arizona, and Hawaii where the increase is 15 cents per barrel.

The increases, effective March 18, apply to all levels of distribution and may be passed on to consumers. The advance applies to Nos. 4, 5, and 6 residual oil, gas and enrichment oil, heavy diesel oil, navy special fuel oil, and bunker C oil.

Asphalt prices were also increased 21 cents per barrel except in the Pacific area where the increase is 15 cents. Tractor fuels were increased ½ cent per gallon except on the Pacific where an increase had been granted previously.

The same time OPA made permanent the ½ cent increase on kerosene and distillate fuel oils which has been in effect on a temporary basis and extended the increase to Montana, Idaho, Wyoming, Utah, and Colorado thus making it uniform for the entire country.

The increases were explained by OPA as necessary to encourage refiners to produce more of these products which are critically short.

No reference was made by OPA to the impending increase of 10 cents per barrel in the price of crude, the effective date of which has been set at March 29. Refiners have protested that they cannot absorb this increase and OPA's refinery advisory committee is currently conducting a cost survey with a view to laying the basis for a further increase in products prices.

Meanwhile, OPA's crude oil advisory committee dissatisfied with the 10-cent increase met March 22 with Paul Porter, new OPA administrator, to discuss higher crude prices.

Earlier, the War Shipping Administration said lack of bunker fuel oil has recently delayed the sailing of a number of critical vessels outbound with vital cargoes of relief supplies. The shortage has hit the Gulf and Atlantic Coasts, WSA said, and although the situation on the Pacific Coast is not so critical, stocks of bunker fuel are far below normal.

Unwanted Oil-Price Controls Seem Headed for Discard

by Henry D. Ralph

WASHINGTON. — Oil-price control appears definitely on the way out. As oil industry spokesmen prepared to demand of Congress this week that all controls over crude and products be removed, the Office of Price Administration continued to lift the lid a bit in the spots of greatest pressure.

The 10-cent increase in crude prices is being followed by a spot-check survey to see how much more crude prices should advance under OPA's formula of permitting an industry to maintain its prewar earnings.

On top of this Chester Bowles, now economic stabilizer, wrote Rep. Wright Patman of Texas that he is informed by OPA, his old agency, that "a successful suspension program can be worked out for the oil industry within 6 months and possibly prior to June 30."

If these actions were designed to salve the oil industry and relieve its pressure against OPA they have proved to be boomerangs. Their net result has been to egg the industry on and to bolster the arguments that there is no need for any price controls over either crude or any of its products.

This was the theme of an extensive presentation before the House banking and currency committee on March 21. Spokesmen for the American Petroleum Institute and the Independent Petroleum Association of America presented statistics to prove that the over-all supply is ample to meet all demands, that removal of controls will permit adjustments in products prices which will quickly relieve shortages in certain products, and that in a free market prices will soon become stabilized at an average level only slightly above the present.

Instead of being hailed as good news, the Bowles letter met considerable derision. Why, it was asked, should it take OPA several months to work out a program of decontrol, when a few hours should be long enough?

Removal, Not Suspension

Moreover, the industry wants complete removal of controls, not just a suspension which would allow OPA to move back in at any time. Top administration policy makers have said on various occasions that price controls would be removed from articles no longer scarce and that prices would be permitted to rise wherever they are preventing production. The industry is now going to bat on the thesis that crude is in ample supply and that refined products currently scarce will become plentiful with a slight price rise.

Congress will be more sympathetic to the industry's request for decontrol than it has been in previous years to requests for legislative action to require OPA to boost crude prices. The price-control act will be extended, but amendments specifically exempting certain commodities have little chance of adoption.

However, there is every prospect that Congress will approve a formula for automatic decontrol of any commodity or industry under stipulated conditions, and this is what most of the oil industry witnesses sought before the committee. Last week both the Senate small business committee and an unofficial bipartisan group of House members endorsed proposals that controls be lifted whenever the supply of any commodity reaches approximate balance with demand, and that OPA's definition of costs and its earnings standards be liberalized.

The official attitude of OPA is that too many such amendments would nullify price control so effectively that the law might as well be dropped outright. Theoretically, they say, there is no objection to a provision

Major Companies Ready To Post Higher Price

Eight major oil companies have announced their readiness to pay 10 cents a barrel more for crude as soon as the Office of Price Administration makes effective its ceiling increase.

The raise in crude ceilings will go into effect March 29.

Companies announcing they will post prices to meet the new ceilings: The Texas Co., Humble Oil & Refining Co., Mid-Continent Petroleum Corp., Phillips Petroleum Co., Carter Oil Co., Stanolind Oil & Gas Co., and Stanolind Oil Purchasing Co.

for exempting a commodity when supply and demand are in balance but the difficulty comes in determining this point administratively and in being sure it will stay that way after controls are removed.

However, OPA is no longer quite so afraid of lifting individual prices as it was during the war when any upward price action was seized upon as a precedent by producers of all other commodities. During the past few weeks OPA has raised a great many prices and is promising to raise more. It has various formulas for justifying these increases, but it is evidently adopting appeasement tactics to head off drastic action by Congress.

The oil industry won't be appeased. By the time the hearings are concluded it will be apparent that nothing less than complete decontrol will be satisfactory, and Congress will have before it some pretty sound arguments for fencing in OPA and keeping the oil industry on the outside.

Independents Plead for Conditions Favorable to Finding New Oil

WASHINGTON. — Independent oil producers will discover and develop sufficient new crude oil to maintain the nation's reserves if given adequate Government support, and at the same time the existence of conditions favorable to independents is the best guarantee against monopoly in the oil industry.

This was the theme of witnesses testifying this week before the Senate petroleum resources committee on the general subject of the independent company.

Conditions described as essential included:

1. A crude price high enough to encourage risk taking and to compensate for exploration and secondary recovery projects.
2. Protection against importation of large volumes of low-price foreign oil.
3. A sound and stable tax policy including retention of the depletion and intangible drilling allowances.
4. Conservation policy based on use rather than hoarding.
5. State rather than federal regulation of production.
6. Access to oil on public lands.
7. Government research on technical problems of production and secondary recovery.

Opening witness was B. A. Hardey, president of Independent Petroleum Association of America and chairman of an industry group selected to make the presentation. The independent producer has the skill and knowledge to find and develop more oil fields and he has also been instrumental in keeping competition alive in the oil industry for monopoly cannot exist so long as there is an independent source of crude for independent refiners, Hardey told the committee. He pointed out that independents have been retiring from the business during the war and unless this trend is reversed the nation will lose the know-how of thousands of producers.

"The United States," Hardey declared, "has a choice to make. It can be self-reliant, with an assured supply of petroleum products at fair prices, a system of aggressive competition, or it can drift into a position of dependence on the oil of foreign nations, supplied by a few companies and with a once-great independent industry moving to complete extinction."

Defining an independent as a firm whose actual management and financial source are substantially the same, Russell B. Brown, general counsel of I.P.A.A., declared that independents have led in oil discoveries, in development of conservation practices, and in secondary recovery projects.

Definition of Conservation

A true conservation policy is one which fosters finding more oil while preventing physical waste, Brown said, attacking the theory that we should freeze our reserves at the present level and import for current consumption. There will be no discovery unless reserves are used sufficiently to compensate for their discovery and development, Brown told the committee, since discovery effort is financed from the sale of petroleum.

"Materials laid away or stored for certain use furnish little hope for development beyond that use. Had we stored our reserves of petroleum when its use was confined to lighting a lamp it would have been suitable for little more than lighting a lamp."

Brown also stoutly defended state regulation of production and conservation practices, tracing its history to show that conservation has been a natural development, never static, but based upon experience and worked out by practice with the operators and not thrust upon the industry as a ukase from high authority.

E. C. Bailey, producer of El Dorado, Ark., told the committee that in formulating a national oil policy recognition must be given to the pioneering and risk-taking spirit of independents if the stability of the domestic industry is to be maintained. He explained a number of ways in which independents are better able to conduct exploratory work than major companies, such as assembling acreage blocks and arranging cooperative drilling by many lease owners.

Secondary recovery methods were described by Don T. Andrus, of the Pennsylvania Grade Crude Oil Association, Bradford. He said that while our oil reserves are figured at 20 billion barrels by known recovery methods there is another 100 billion left in the sands which might be obtained by secondary recovery processes. He urged Government aid in developing such processes, both by large appropriations to the Bureau of Mines for research and by permitting a price of oil which would make it profitable to install such system. The price of oil always has been based on competitive flowing, not efficient cleanup, he said, declaring that true conservation can come only when it is made economically attractive. Andrus declared that an increase of 1 cent per gallon in the price of crude, small compared with gasoline taxes averaging 6 cents per gallon, would be enough to make tremendous amounts of additional oil available through secondary recovery.

The stripper-well problem was described to the committee by H. M. McClure, Alma, Mich., president of the National Stripper Well Association, who declared that the production from stripper wells in this country is almost equal to the production of the entire Asiatic continent, including the much-publicized fields of the Middle East and East Indies. He admitted that there are various theories of what should be done with stripper wells and that the industry is divided on continuance of the subsidy, but declared that it is contrary to sound conservation and national welfare to permit abandonment of stripper wells when the price for oil is less than $2 or $2.25 per barrel, which is the estimated cost of obtaining crude from shale, the next cheapest source of supply. Three others who testified during the opening days of the hearings were Charles R. Bell, controller, Kerr-McGee Oil Industries, Inc., Oklahoma City, on the subject of taxes; Merle Becker, vice president of W. C. McBride, Inc., St. Louis, who discussed costs and price of oil; Wirt Franklin, Ardmore, Okla., on the subject of imports, and Fayette B. Dow, National Petroleum Association, who discussed the independent refiner.

H. B. Fell, vice president of I.P.A.A., summarized the presentations of the industry committee, following which Chairman Joseph C. O'Mahoney of Wyoming opened the hearing to others who wish to testify on any aspect of the position of the independent oil man.

Synthetic-Rubber Production Must Total Third of All Consumption

WASHINGTON. — Synthetic rubber and butadiene plants should be sold to private industry under conditions which will insure that they produce about one-third of our total rubber consumption, it is recommended in the first report of the Interagency Policy Committee on Rubber.

Detailed provisions for accomplishing this will be made in a later report but meanwhile the committee recommended that all efficient plants be operated by the Government at a high level of output for another 2 years or until ample natural rubber becomes available. However, it recommended immediate sale of Government-owned butyl and neoprene rubber plants and also styrene plants, but under conditions not requiring the plants to be closed down during the disposal process.

The long-range policy urged on congress is that the Government make sure that a minimum amount of synthetic rubber is always produced in this country, whether by tariff, subsidy, or other means not yet determined, and that this be produced by private industry. The committee set 250,000 long tons annually as a desirable figure, estimating this at about one-third normal postwar consumption. Beyond that figure synthetic and natural would compete on an equal basis, though the committee said it would benefit world trade if imports of natural were maintained at about 500,000 tons, or close to prewar purchases.

Synthetic-rubber and butadiene plants not sold to private industry should be maintained by the Government in standby condition for national emergencies, including one alcohol butadiene plant. However, the committee declared there is no justification for maintaining any alcohol butadiene plant in operation even with a subsidy to utilize surplus grains or farm wastes.

Plants should be sold in such a way as to encourage competition in research and better processes, but efficiency should be maintained by limiting sales so that selected plants may operate at high levels of capacity, it is recommended. With respect to butadiene the committee said continued development is essential in connection with all petroleum processes with the exception of that involving the thermal cracking of petroleum naphthas, declaring:

"The principal petroleum processes to be continued in operation involve the dehydrogenation of normal butylene and dehydrogenation of butane. Although the plants using butylene as a feed stock all make use of the same fundamental principles, there are important engineering variations in the application of these principles. In the plants using butane as a feed stock, there are variations in engineering principles as well as in their applications. It is believed that all processes will be economically competitive and the committee feels that the maintenance and operation of representative plants of each type is eminently desirable.

"The committee's recommended minimum production level of 250,000 tons of general-purpose synthetic is believed to be sufficient to permit the economical operation of the requisite plant types to meet the minimum objectives of feed stock and process variability."

Navy Now Retains Only Four Oil Properties

THE signing of four contracts, one of which permitted the release of another Navy-held refinery, featured labor developments in oil and related industries during the week.

The Reed Roller Bit strike in Houston came to an end when C.I.O. union officials and the management agreed on an immediate 16-cent an hour increase and an additional 2½ cents to be effective as soon as the Office of Price Administration grants the company a 15 per cent raise in its prices.

The dispute between the steelworkers and another large Houston equipment plant, Hughes Tool Co., continued. Noah Dietrich, Hughes executive vice president, asserted the union settled with Reed at "basically the same offer" Hughes had made.

"The union refused to accept this same type offer from us before the strike began," he said. Dietrich said the company's position will be unchanged when he meets in Washington this week with Phillip Murray, national C.I.O. president, in another effort to settle the controversy.

Phillips Petroleum Co. signed with the C.I.O. oil workers union for its refinery at Kansas City, Kans. Control of the plant was returned to the company by the Navy which was left with only three refineries and one pipe line of the 53 properties seized during the oil workers' strike last October.

In Houston, Emsco Derrick & Equipment Co. signed contracts with the International Association of Machinists and the A. F. of L. boilermakers union. The agreement calling for an 18½ cent hourly wage increase was negotiated without strike or strike threat.

In Los Angeles, the C.I.O. Utility Workers Union of America and Southern California Gas Co. reached a wage agreement after 4 months of negotiation. The union and the company agreed to split the difference between a 15 per cent offer by the company and a 30 per cent demand of the union.

A National Labor Relations Board announcement said production and maintenance employes of Phillips Petroleum Co., Bartlesville, Okla., are voting for or against representation by the C.I.O. oil workers union. Another board announcement disclosed the International Union of Operating Engineers has been certified for clerical employes in the production department of Gulf Oil Corp. at Crane, Tex., following an election.

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- **The most complete plant survey ever compiled, showing companies, plant locations, refining capacity and pertinent data on war facilities.**

THIS WEEK

PRICES—Ceilings lifted 15 to 21 cents per barrel on residual and Navy special fuel oil. . . . Refiners authorized to pass increase on to consumers. . . . Half-cent raise on kerosene made permanent. . . . ¶Ten-cent crude rise becomes effective March 29. . . . Most buyers announce readiness to post 10-cent advance when OPA flashes green light. . . . ¶Some refiners intend to lift motor-fuel tank-car quotations 3/8 cent when crude advance becomes effective. . . . ¶Industry continues fight for decontrol of petroleum prices. . . . OPA suggestion that oil-price controls can be dropped in 6 months draws criticism. . . . A.P.I. and I.P.A.A. spokesmen argue before congressional committees that further delay is unnecessary. . . . Point driven home that adequate supply meets government specifications for price decontrol. . .

TRANSPORTATION—Texas group bids $40,000,000 for WEP's two lines and Southwest Emergency system. . . . Organization of independent group to operate big-inch lines as common carriers may be sought by War Assets Corp. . . . ¶Final hearings on Texas-California 26-in. gas line scheduled next month at Los Angeles. . . .

FOREIGN—Soviets make bold bid for Iranian oil concessions. . . . Continuation of military establishments admittedly linked with desire for oil rights. . . . ¶Date for Senate consideration of Anglo-American pact remains uncertain. . . . Opponents of agreement intensify efforts to discredit pact. . . . ¶Another Venezuelan wildcat northwest of Santa Barbara cores saturated oil sand. . . . Five potential oil discoveries in Venezuela registered so far this year. . . . Approximately 30 wildcats drilling. . . . ¶Rumor spreads that Soviet has purchased pipe in United States for line from Romania to prewar Russian refining centers. . . .

SUPPLY—Texas ignores Washington requests for 2,000,000 bbl. daily allowable in April. . . . Proration schedule fixed about 180,000 bbl. per day below federal recommendation. . . . ¶Regulators suggest use of storage oil, if needed. . . . Certain refiners assert crude stocks now at minimum working levels. . . . ¶Exceedingly low inventory of residuals and other fuels blamed on OPA. . . .

LABOR—Navy retains only three refineries and one pipe line under its jurisdiction. . . . ¶Equipment manufacturers gradually regain normal stride. . . . ¶Backwash from steel strike threatening immediate tubular-goods supply. . . . Most operating companies have adequate inventories to cover lag in shipments. . . .

CONGRESS—Independents cite record in discovery and production technique. . . . Claim higher crude prices, freedom in operations essential to independent preservation. . . . ¶Withdrawal of Pauley nomination ends squabble which did industry no good. . . . Record of industry and oil men in general staunchly defended by speeches in Congressional Record. . . . ¶Hearing record shows Pauley accusers vindictive and malicious. . . .

DRILLING—Well completions higher. . . . Total of 541 completions for week highest since mid-January. . . . Wildcat completions also increased, totaling 79 for week, but activity is below last year. . . .

REFINING—Committee recommends sale of synthetic-rubber plants to private industry. . . . Proposes annual production of 250,000 tons under subsidy, special tax privileges or whatever is necessary to keep domestic plants active. . . . All but one synthetic plant would operate on petroleum base stock. . . .

Crude oil which escaped through a break in a pipe line into the Canadian River, 20 miles upstream from Union City, Okla., billowed into a fiery, smoky cloud as it rolled slowly down the wide, shallow river. The oil was trapped and burned in a series of small lakes along a 15-mile stretch, and no property damage ensued, though state troopers maintained a watch to insure that a highway and railroad bridge were not endangered. The break in the oil line was hastily repaired

Texas Allowable for April Disregards Pleas From Washington

by Dahl M. Duff

RESPONSIBILITY for meeting the current shortage of heavier refined products was tossed from Washington to Texas and back again to Washington last week.

Three days before the state-wide allowable hearing in Austin, three high federal officials, including James Forrestal, Navy secretary, wired the Texas Railroad Commission that a 2,000,000-bbl. daily crude production is needed in the state to give "the imperatively needed volume of fuel oils and other products."

Action of the commissioners the next few days gave the federal group its answer. At the Austin meeting, the expected lineup of refiners vs. producers developed, and the commission set production for April at a figure some 180,000 bbl. below the requested 2,000,000.

In a statement following the action, Ernest O. Thompson, member of the commission, made plain his opinion that the place to solve the fuel-oil shortage is in Washington.

"The reason that there is a shortage of fuel oil is that the price has been too low to make a profit for the refiners to turn it out," he said. "When the price is fair and compensatory, there will naturally follow a full supply of fuel oil or any other product."

Texas oil production in the week ending March 16 stood at 1,817,450 bbl., unchanged from the previous week. As of February 16, the state was producing 2,238,879 bbl. daily. The national total stood at 4,404,330 bbl. daily in the week ending March 16, against 4,694,340 bbl. February 16.

The commission's April allowable order will provide only about a 45,000-bbl. increase over March. The allowed production of 1,943,122 bbl. will yield about 1,816,000 bbl. considering an estimated underproduction of 6.5 per cent. Revised March allowable figure was given as 1,897,201 bbl.

Conservation is the legal basis for the Railroad Commission's regulation of oil and gas in Texas. At the outset of the hearing, Olin Culberson, chairman, requested that no discussion of price enter into the meeting.

Representatives of Houston and Gulf Coast refineries presented a solid lineup in favor of lifting the lid on April production. Against them, advocating continued reduced allowables, were the producers, particularly the independents. All sides, however, seemed in agreement that the OPA took blame for the whole situation.

Representing Humble Oil & Refining Co., largest producer and purchaser of oil in the state, J. A. Neath told the commission that Humble's stocks were at 11,473,000 bbl., the lowest at which it could maintain its level of operation. Stock withdrawals, he said, amount to 32,000 bbl. daily.

Similar statements were made by other refinery representatives. H. S. Lane, representing Crown Central Petroleum Corp., said his company was running short of crude by 8,000 to 9,000 bbl. daily. T. J. Henry, Atlantic Refining Co., asserted the company is running short 25,000 bbl. daily and is unable to purchase additional supplies. Paul McDermott, Sinclair Prairie Oil Co., said the company has no stocks of crude from Texas production and is drawing on other stocks at a rate of 24,000 bbl. daily.

An interpretation widespread after the meeting pointed to the fundamental economics of the situation. Producers are anxious to keep their oil in the ground with a 10-cent raise in price assured and a higher one hoped for. Refiners, on the other hand, want as much oil as possible in their tanks before the price goes up.

Gasoline Market Reacts To Higher Consumption

GASOLINE markets on both coasts and in the interior were extremely bullish this week, with one Mid-Continent refiner preparing to institute a ⅜-cent refinery-gasoline price raise as soon as the new crude ceilings become effective.

The market also reacted to reports of a crude shortage among Texas refineries, warmer weather and unexpectedly high consumption.

Quotations remained generally unchanged for gasoline, but an upward movement was anticipated, except possibly for natural gasoline which is in a seasonal slump. East Texas prices were reported to have advanced in some quarters. Other reports said the output of two large Gulf Coast cycling plants is being taken for export instead of entering the Mid-Continent area.

New York reported a tendency toward a firmer gasoline market due to the crude ceiling increase, decline in inventories in the last 2 weeks, and forecasts for a heavy spring demand. East Coast kerosene stocks were rising in view of the warmer weather.

In California, gasoline demand was high, and marketers said they are expecting 1946 sales to reach new peaks, especially in quality products. Demand for kerosene, and various grades of burning oils continued high on the West Coast.

Improvement in the national labor picture also was encouraging petroleum markets. Predictions of quantity output of automobiles were heard after weeks of strike-stalled production. Market analysts were generally surprised by high gallonage reports. Despite the age of the nation's automobiles, some observers were changing their views and looking forward to heavy travel during the forthcoming first postwar ration-free summer.

Jones Urges Removal of Government Controls

NEW YORK. — Stating that his company was conducting "a more intensive search for new oil reserves here and abroad," W. Alton Jones, president of Cities Service Co., last week urged the prompt removal of the Government's artificial price controls. These statements were made in his company's annual report to stockholders.

Cities Service, in 1945, purchased a one-third interest in Tri-Pet Corp., along with Sinclair Oil Corp., and Richfield Oil Corp. of California, and was formed with foreign crude production primarily in view. (The Oil and Gas Journal, July 7, 1945, p. 66).

In his letter to stockholders, Jones said the "disparity on government-imposed price ceilings on various refined petroleum products has persisted, resulting in an oversupply of some and a shortage of others. Consequently, there is little profit incentive for the risk of capital so essential in the search for new fields." And to bring this matter more closely home, he explained:

Highlights in the operating records of 1945 included the refining of 17 per cent more oil than ever before in the company's history, and the sale of 70,000,000 bbl. of petroleum products, or 15 per cent more than in the record year of 1944. The company also recorded a 15 per cent increase, above 1944, in the sale of natural gas, selling a total of 265,000,000,000 cu. ft. Crude production declined slightly to 26,435,000 bbl.

The report stated that there is no change in the company's policy of retaining all its nonutility companies and disposing of its utility interests to the extent necessary to enable it to apply for an exemption from the provisions of the Public Utility Holding Company Act of 1935.

Pauley's Withdrawal Ends Political Ruckus

WASHINGTON.—President Truman last week withdrew the nomination of Edwin W. Pauley to be Under Secretary of the Navy, thus ending a messy political squabble which did the oil industry no good.

In requesting the withdrawal, Pauley claimed that all the charges against him had been answered and shown to be false and that all his public and private actions had been completely and honestly justified.

This may be true as far as Pauley personally is concerned and certainly no major or even minor oil scandal was unearthed by the rambling hearings of the Senate naval affairs committee. But enough innuendos of dark dealings in oil were mentioned to give the newspaper-reading public the idea that perhaps it is true that no oil man should hold high public office having anything to do with government oil affairs.

If the hearings had gone on Pauley intended to call as witnesses several dozen oil men to prove that criticisms made against him were based on business rivalries and that Pauley's hands were cleaner than his accusers. For example, the committee was somewhat perplexed over Pauley's part in the state fight over California oil-conservation legislation. If this complicated situation had been fully aired it would have contributed nothing to knowledge of Pauley's fitness for a high Navy post, but would have uncovered a lot of skullduggery in California oil politics.

The Pauley incident also further muddied the waters as regards the resolution pending in Congress to renounce federal claims to submerged oil lands, because Pauley was one of many Californians who insisted that the states have a clear title to such lands. The day following Pauley's withdrawal the St. Louis Post-Dispatch published a large advertisement in Washington newspapers intimating that the withdrawal in some way was a victory for the federal Government's claim to tidelands. For months the Post-Dispatch has been conducting a campaign for federal ownership of tidelands, representing the oil industry, and particularly Pauley, as spearheading the claims of the states.

Import Necessity Faces U. S., Texas Co. Says

NEW YORK.—Without new and improved techniques for finding oil, more equitable prices to encourage exploration and the discovery of important new reserves, the United States must become substantially a larger importer of petroleum.

This conclusion was drawn by officials of The Texas Co. in their annual report on the company's 1945 operations. Discovery of new oil during the year was "disappointing," the report said. New pools, with few exceptions, were relatively unimportant.

Summarizing the company's domestic and foreign activities, the report said contracts have been placed for building a large chemical plant near Port Neches, Tex., jointly with American Cyanamid Co. The Texas Co. also has an interest in Carthage Hydrocol, Inc., which proposes to manufacture gasoline from natural gas.

Earnings of Bahrein Petroleum Co., Ltd., and Arabian American Oil Co., both half owned by The Texas Co., were placed at $10,500,000 and $3,600,000, respectively. The Bahrein refinery was running approximately 64,000 bbl. of crude daily at the end of the year. Production by Arabian American during the year averaged 58,400 bbl. daily, a total of 21,300,000 bbl., and a new refinery at Ras Tanura on the Persian Gulf was running about 60,000 bbl. daily at the end of the year. Reserves were materially increased on the Saudi Arabian concession, and the Trans-Arabian Pipe Line Co. incorporated to acquire rights-of-way for the proposed line to the Mediterranean Sea.

FPC Rejects Ford Gas Sale, Denies "End Use" Control

WASHINGTON.—Panhandle Eastern Pipe Line Co.'s application for authority to construct facilities to sell natural gas to Ford Motor Co. was denied here last week by the Federal Power Commission in an opinion denying its action is "an attempt to assert jurisdiction over a direct sale of gas as such."

The pipe line company had entered into a contract with Ford beginning May 1 to supply 25,000,000 cu. ft of gas each week day and 15,000,000 cu. ft. daily on Saturdays, Sundays and holidays. In addition, Ford had an option to increase purchases to a total of 50,000,000 cu. ft. each day.

In dismissing Panhandle's request to construct and operate facilities at a point on its trunk in Wayne County, Michigan, for delivery of gas to Ford, FPC pointed to its previous orders authorizing Panhandle to construct additional facilities but requiring they should not be used for the sale or transportation of gas to any new customer except on specific authorization. The commission said the proposed deliveries to Ford would increase curtailment of service to present interruptible customers.

"The commission wishes to make it plain that its action in this matter is not to be construed as an attempt to assert jurisdiction over a direct sale of gas as such," the opinion said. "However, we do by our action in this matter indicate clearly that, in our opinion, the natural gas act does confer on the commission jurisdiction over a company found to be a natural-gas company within the meaning of the natural gas act and over the facilities used by such company in either transporting natural gas in interstate commerce, or in the sale of such gas for resale, especially to the extent necessary to enable the commission to protect the adequacy of service to its customers."

The proposal to supply gas to Ford had been protested by the cities of Detroit and Dearborn, Mich., the states of Indiana and Michigan and several distributing companies supplied by Panhandle, on grounds service to present customers would be impaired.

Liquidation of PAW Scheduled April 30

WASHINGTON.—The Petroleum Administration for War is due to pass into the realm of history April 30.

Acting Administrator Ralph K. Davies has asked the President to issue an executive order liquidating the agency on that date. He pointed out the termination order will make good the Government's promise to discontinue the agency when it completed its wartime purpose.

Petroleum Administration for War, headed during nearly all of its life by Harold L. Ickes, former secretary of the interior, exerted a powerful influence on the industry during the war years. It was created May 28, 1941, as the Office of Petroleum Coordinator and subsequently became PAW.

Cooperative Acquires Oklahoma Production

CUSHING, Okla.—Midland Cooperative Wholesale has entered the production phase of the oil business with the purchase of three leases including 22 wells in the Cheyarha pool of Seminole County, Oklahoma.

The cooperative, which has its head office in Minneapolis, has operated its own refinery for several years at Cushing. M. E. James, assistant to Rex Winget, manager of the plant here, said no definite plans have yet been made for moving oil from Seminole County to Cushing.

The three leases totaling 440 acres and producing about 1,500 bbl. daily were bought from Wrightsman Oil Co., J. E. Hall and Troupe & Moore. The Cushing refinery has a capacity of about 4,500 bbl. daily with a cracking unit capable of an additional 1,700 bbl. daily.

Many Engineering Developments Discussed by Standard (N.J.) Groups

by Kenneth B. Barnes

ST. LOUIS. — World-scattered oil finding, producing, and transportation problems and developments were widely covered from engineering aspects here last week by Standard Oil Co. (N.J.) subsidiary and affiliated companies. A wide range of subjects of both a research and operating nature were discussed at the sessions here March 11 to 15, attended by some 240 executive and technical men.

Foreign operations of the Jersey company were well represented with executives, drilling and production engineers, pipe line men, geologists, and geophysicists from Venezuela, Canada, Peru, Colombia, Argentina, Ecuador, Egypt, and the Netherlands East Indies.

L. F. McCollum, coordinator of production for Standard Oil Co. (N.J.) was general chairman of the meeting. Among those present were John R. Suman, vice president and director of Jersey, B. B. Howard and S. P. Coleman, Jersey directors; Oscar Schorp, president of the Carter Oil Co., Tulsa, and Rex G. Baker, director and general counsel of Humble Oil & Refining Co., Houston, and W. R. Finney, pipe line adviser to the parent company.

Commenting on the meeting, McCollum said that this was the first gathering of the Jersey producing group since 1942, the war having caused interruption in the program of regular yearly meetings.

"These conferences," McCollum said "provide a forum for the exchange of technical information among the personnel of the producing affiliates and for the discussion and examination of the technical problems facing these companies. The meetings bring together the research, engineering, geological and operating groups for discussions which are mutually helpful. Such meetings are, we feel, absolutely essential to maintenance of high standards of efficiency throughout our world-wide operations, and which in turn means lowered producing costs."

Most or all new technical developments and practices discussed at these meetings, McCollum pointed out, are eventually made available to the industry as a whole through the media of trade-journal articles, the various technical societies, etc.

Above: At the meetings were J. W. Brice, Standard Oil Co. of New Jersey, New York; Jack Berlin, Standard-Vacuum Co., New York; R. P. Russell, Standard Oil Development Co., New York; J. R. Suman, Standard Oil Co. (N. J.), New York. Below: H. H. Hill, Standard Oil Co. (N. J.), New York; C. E. Reistle, Humble Oil & Refining Co., Houston; B. B. Howard, Standard Oil Co. (N. J.), New York; O. C. Schorp, Carter Oil Co., Tulsa

Well Rounded Programs for All Technical Groups

Approximately 140 papers were presented and discussed before the group. At the general sessions, attended by the entire group, papers were read on the application of new tools of science to the problems of producing oil, legislative trends both foreign and domestic which would affect the industry, and problems relating to natural-gas conservation. Members of the Standard Oil Development Co. had presentations on new analytical techniques applied to the composition and utilization of petroleum, the manufacture of chemicals from petroleum, and the manufacture of liquid hydrocarbons from sources other than petroleum. Considerable attention also was given to the outlook for crude supply and demand and the cost of finding new reserves.

Substantial expansions of all phases of research, in exploration, production, and pipe-line transportation were among other topics.

Topics Covered During the Production Sessions

Among the problems discussed by the producing group were corrosion of oil-fluid installations, drilling and producing practices and equipment, and reservoir engineering. Corrosion problems and research as related to hydrogen sulfide, electrolysis, salt water, and in condensate production, together with preventive methods and procedures for investigating and reporting corrosion failures, were reviewed by engineers of the Humble Oil & Refining Co. and Carter Oil Co.

On well completion subjects, the use of multiple-zone equipment and the performance of gun perforated, window and open-hole production were discussed, along with new developments in workover and plug-

Paul Lambright, International Petroleum Co., Toronto; J. A. Clark, Creole Petroleum Corp., New York; W. R. Finney, Standard Oil Co. (N. J.), New York; L. F. McCollum, Standard Oil Co. (N. J.), New York

back practices, use of plastics, and radioactivity markers in determining casing points. Other papers were concerned with the desulfurization and dehydration of natural gas and problems and new developments in salt-water disposal systems. Rotary drilling discussions included papers on rig equipment for 15,000-ft. wells, the relation of hydraulics to rotary drilling, improvements in mud control, in cementing practices, and in drill-stem formation testing technique and equipment. Oil well pumping and producing equipment were discussed.

Reservoir behavior was treated in articles on the determination of efficient producing rates, effect of well spacing on ultimate oil recovery, consolidation of loose sands, developments in material-balance methods and connate water determinations. Estimation of subsurface fluid characteristics, primary reservoir control by water injection, and displacement of fluids by water and by gas were additional topics discussed in this important division.

A variety of pipe line engineering and operating details were discussed both as to crude-oil and product systems, and as to aerial patrols, cathodic protection of tank farms and pump station installations, metering, pumps and engines, design factors, maintenance and reconditioning work.

"Oil basins" were a highlight in the meetings devoted to exploration, both from the theoretical side in such discussions as the mechanics of basin evolution and their relation to oil accumulation, and in practical viewpoints involved in many basin areas in North and South America. Seismic, gravimeter and magnetometer surveys were covered in other talks on techniques and interpretations. Geological problems ranging from the Cretaceous oil potentialities in the Maracaibo Basin, studies in other foreign areas, occurrence of oil in Florida, on through to those in the Corpus Christi, West Texas-New Mexico, Rocky Mountain, and western Canada areas, completed the agenda.

Atomic Power Deemed Unsuitable For Use in Mobile Units

ST. LOUIS. — The possibility that atomic energy may some day be used to supply heat and power to cities and large industrial plants was cited here last week by Arthur H. Compton, chancellor of Washington University, in an address before a forum of scientists and engineers employed by companies throughout the world affiliated with Standard Oil Co. (N. J.)

Stressing the fact that atomic power plants must be insulated with massive walls, Compton scouted the idea that motor cars or airplanes could be propelled by atomic energy.

"There is no reason to hope that atomic power units for normal use can be built that will weigh less than perhaps 100 tons," he declared. "Driving motor cars or airplanes of ordinary size by atomic power must be counted out."

Among the advantages of atomic power, he listed the extraordinary low rate of fuel consumption, and consequent low cost of fuel; the wide flexibility and easy control of the rate at which power is developed; and the complete absence at the power plant of smoke or noxious fumes.

"With regard to fuel consumption," he said, "the fission energy available from a pound of uranium is equivalent to burning over 1,000 tons of coal. With the prewar price of uranium oxide at roughly $3 a pound and the price of coal at $3 a ton, this would mean the economical use of uranium as fuel if only one part in a thousand of its available energy is used. It appears that the fuel cost of the atomic power plant of the future will be small as compared with the corresponding fuel cost of a coal-burning plant.

"In considering the economic aspects, there are, however, many other factors. It is not really possible for these to be explored until we have actual experience with atomic power plants. First is the capital cost. Clearly, if one must charge against the capital cost what is spent in research and development, this cost is very high indeed.

If, however, one looks down the line to a billion-dollar-a-year national industry based on atomic power, the nation can afford a considerable investment in the resarch and development required to bring this industry into being."

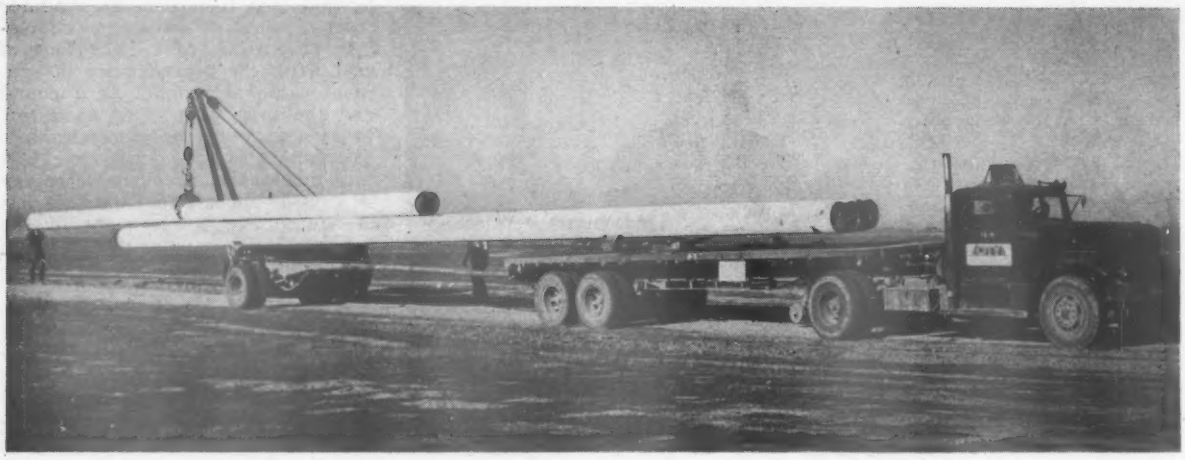
Phillips Cores Oil Sand in First Venezuelan Well

BARTLESVILLE, Okla. — The first exploratory test well drilled in Venezuela by Phillips Venezuelan Oil Co. has cored saturated oil sand from 4,675 to 4,702 ft. This oil horizon is in the La Pica formation in which oil sands ranging up to several hundred feet of thickness generally are found in the locality. Additional coring is now being done preliminary to running pipe and testing. This well, known as the FT-1, is in the northeast portion of a 25,000-acre block of exploitation leases, known as the Mata Grande block, in the State of Monagas, eastern Venezuela.

The company, a wholly owned subsidiary of Phillips Petroleum Co., Bartlesville, has been conducting exploratory work in Venezuela approximately 1 year during which camps, warehouses, and offices have been established with general headquarters in Caracas. Phillips Venezuelan Oil Co. holds exploration or development rights on four other large blocks in eastern Venezuela, all of its holdings in that country totaling 869,603 acres.

Texas Underproduces

AUSTIN.—Underproduction below state allowables ranging from 2.85 per cent in East Texas to 15.85 per cent in the Abilene area is reported in Texas during January. Overall underproduction was 7.58 per cent, according to the Railroad Commission. Total oil production was 62,941,493 bbl.—5,161,595 bbl. below full allowables.



Stringing double-length (80-ft.) pipe on new valley line

Construction Innovations Used on California's Stanpac Pipe Line

by L. P. Stockman

CONSTRUCTION work on California's first pipe-line project of 1946 and the first major crude-oil installation in several years is well under way on Standard Oil Co. of California's right-of-way extending northward from Kettleman Hills in the San Joaquin Valley to Los Medanos tank farm near Pittsburg which supplies the Richmond refinery through existing lines. Plans call for completion of the new project, which will cost $4,000,000 by early summer. Originally it was expected this new 18-in. pipe line would be completed in May, 4 months after actual pipe-laying operations began, but the steel-industry labor tieup has delayed delivery of pipe to some extent. Upon completion of this new crude oil line, the Stanpac line will be reconverted to natural-gas service delivering natural gas from San Joaquin Valley fields to San Francisco. The Stanpac pipe line was converted from natural-gas to crude-oil operation early in 1942 as a supplement to tanker transportation.

Standard of California operated the Stanpac line as an emergency facility and moved 185,000 bbl. per day for the joint account of itself, Shell Oil Co., Inc., Tide Water Associated Oil Co., and Union Oil Co., which concerns have refineries in the San Francisco Bay region. In addition to pooling of facilities, Shell converted its low-pressure crude-oil line to a high-pressure system and thus increased its capacity. By mutual arrangement and as an approved war service, all light grades of crude oil were moved through the Stanpac line and the heavier grades through facilities of Shell and Tide Water Associated which had heating equipment already installed at pump stations. The Stanpac line is owned jointly by Pacific Gas & Electric Co., Standard of California, and Pacific Public Service Co.

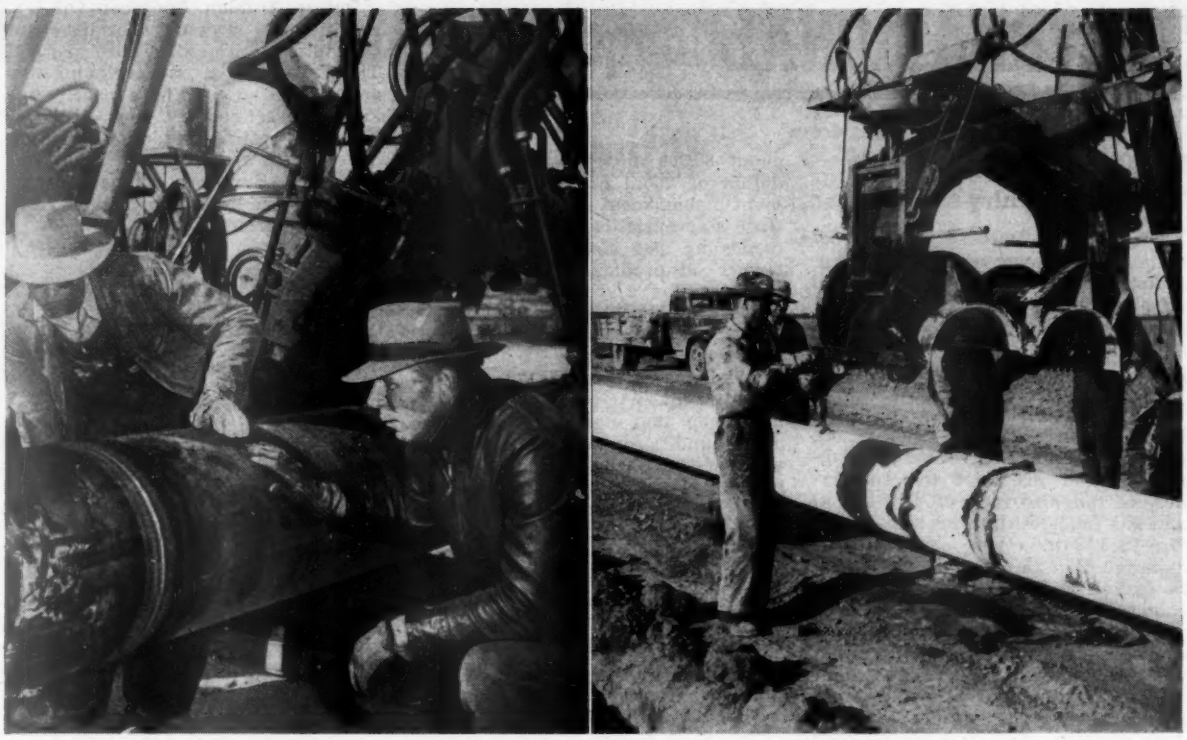
Pressure Process Used

Standard's specifications for the new San Joaquin Valley pipe line call for three innovations in California pipe-line construction methods. Building of 40 miles of the new line will be by the new semiautomatic pressure-weld process developed by Pressure Weld Co. and which has been used successfully in Texas and the Mid-Continent. Also in use for the first time by the company is electric-weld pipe with extra high yield points. This type of 18-in. pipe will be laid on 167 miles of the new project. The remaining 9 miles of the new line will consist of 20-in. pipe. Steel in the normal-strength pipe has a specific minimum yield point of 45,000 psi. The high-strength pipe to be used has a minimum yield of 52,000 psi. and an ultimate strength of 72,000 psi.

Gamma-ray photos will be used to spot check a number of welds daily and this will constitute an interesting method of making accurate field tests of weld quality. The photo negatives, packaged in lightproof strips, are wrapped around the weld and a small piece of radium is then lowered through an opening to a position approximately in the center of the weld's diameter. The rays thus emanating from the radium go through the weld and any defects are recorded on the negative. Telemeter circuits will be provided on Standard's existing telephone system which will transmit flow-meter readings from both ends of the line and from Los Banos to the gager's office at Los Medanos terminal.

Corrosion protection will be provided on 100 miles of the line in the more corrosive areas through the use of Somastic pipe coating and asphalt and fabric wrapping will be used on pipe laid in noncorrosive soils.

Although Standard decided some years ago that it was cheaper and more economical to move San Joaquin Valley crude oil to tide water at Estero by pipe line and then northward or southward by tanker, the decision made late last year to lay a new 18-in. pipe line from Kettleman to Los Medanos tank farm does not indicate a change in policy. For 25 years, prior to 1929, all San Joaquin Valley crude oil was moved to Richmond refinery through a 20-station trunk line extending northward for a distance of 280 miles from Bakersfield in Kern County. This was a small-diameter line and because of the numerous pump stations was a costly system to operate. With the discovery of prolific production in the Kettleman North Dome field, where Standard owns in fee every alternate 640 acres of productive land, it was found more economical to move this oil by a new direct route to the nearest deep water at Estero where the company constructed a tank farm and loading facilities. The movement of crude oil via Estero had



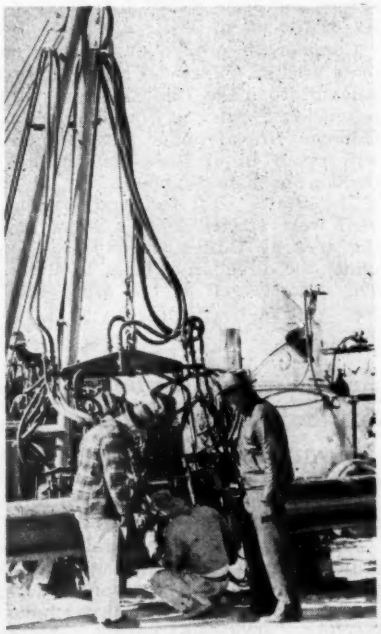
Left: Newly made pressure weld on line. Right: Removing mold after Somastic coating of field weld

a further advantage as it enabled the company to ship cargoes north to Richmond refinery, south to El Segundo refinery and to other domestic terminals and foreign shipping points.

Earlier Line Requirements

When extensive pipe-line replacements became necessary in 1934, the Bakersfield-Richmond pipe-line system was abandoned and a second line constructed to Estero Bay. Upon completion of this second line all San Joaquin Valley crude oil was handled via Estero Bay until war conditions in 1942 removed tankers from the Richmond run and the Stanpac natural gas line was converted to crude-oil service. The original Kettleman-to-Estero line was laid in 1929, was 70 miles in length, was acetylene welded 10-in. pipe, and operated at 1,000 psi., a high pressure for this diameter pipe, and was capable of moving 35,000 bbl. daily. Standard's present pipe-line facilities to Estero include two crude-oil lines, the second extending from Rio Bravo to Estero a distance of 108 miles and having a diameter of 12 in. In 1930, Standard laid an 8-in. product line from Kettleman Hills to handle natural gasoline. Loading facilities at Estero consist of 16-in. welded submarine lines extending 3,000 ft. seaward.

As an efficiency measure and because the demands of the Richmond refinery exceeded the capacity of the Estero lines, Standard decided to construct the new line from Kettleman to Los Medanos tank farm. The advantages of a large-diameter line were demonstrated through operation of the Stanpac pipe line. Standard's original plans contemplated the movement of 85,000 bbl. per day northward to Los Medanos tank farm but a subsequent check indicated the amount of light crude might reach 110,000 bbl. daily and accordingly it was decided to construct a pump station at Los Banos to increase capacity of the line. The light grades of crude to be moved will originate at Kettleman Hills, Coalinga, Greeley, Rio Bravo, and other similar San Joaquin Valley fields.



Pressure-weld machine in operation. Operators are heating pipe

Existing steam-turbine-driven centrifugal pumps at Kettleman Hills will give initial impetus to the oil stream and can maintain a pressure of 900 psi. Equipment to be installed in the Los Banos booster station will be capable of adding 650 lb. pressure to the line at that point and the resulting 750 lb. discharge pressure will be sufficient to carry a capacity load 80 miles to the Los Medanos tanks. To withstand initial pressures at these two pumping stations, special high-strength pipe will be used for 41 miles north of Kettleman Hills and for 19 miles beyond the Los Banos stations. The new pipe line will handle only light grades of crude oil and heavy oil will go via Estero Bay. The construction contract for the new line was awarded to Bechtel Brothers McCone Co. on a bid of $1,002,400. The remaining cost of the line will be for pipe, pumping equipment, right-of-way, and other expenses. A total of 21,000 tons of pipe is being supplied by A. O. Smith Co.

INTERNATIONAL

Russian Industry Working To Meet Country's Needs

CHICAGO. — Because of the demands of its own reconversion program, Russia is not expected to sell oil abroad as it did immediately before the war, according to a report on the Russian industry from information assembled by Universal Oil Products Co.

The report, based on translations from Soviet periodicals, points out that production and refining is lagging behind needs of the country, despite the discovery of 38 new oil and gas fields during the war period. "In 1945," the report says, "it was apparent that the oil industry would be unable to supply the needs of the country."

Along with the Russian oil expansion program, the report predicted that development of petroleum substitutes will continue. In a recent speech Stalin called on the country to produce 60,000,000 tons (435,960,000 bbl.) annually, twice reliable estimates of present production.

Lack of suitable equipment is hampering deep well exploration by the Russians. Drilling below 6,500 ft. is reported to be in the development stage. During the war, the Soviets greatly expanded the turbine method of drilling. In refining, Russians are working at their Ufa plant on dehydration, desalting, and desulfurization. In Baku, alkali treating is used with ground water naturally containing alkalies. At other refining centers, American technical methods are being adopted.

Writer Says Pemex Deficit Amounts to $112,000,000

MEXICO CITY. — By producing from proven areas without laying aside funds for exploring for new reserves, Mexico's oil industry is some $112,000,000 poorer since expropriation in the opinion of Manuel A. Hernandez, editor of El Economista.

In an article in the magazine, Hernandez said the Government oil administration, Pemex, has accumulated a deficit of about $200,000,000, about half of which represents its inability to accumulate an amortization fund for exploration. This means, he said, the industry is worth that much less because oil has been extracted without finding new reserves.

The remainder of the deficit represents actual loss of income. Hernandez said the administration is losing about $6,000 a day with an annual deficit of about $20,000,000. Government management of the oil business since expropriation of foreign companies in 1938 also has resulted in "fewer oil products," he said.

The editor said the situation regarding exploration is farcical because "up to now no new oil deposits have been discovered. That productive wells have been drilled in places already proved to be oil bearing does not mean that new oil fields have been found." In placing the industry's value at $112,000,000 less than in 1938, he pointed out foreign companies formerly charged 30 to 40 cents a barrel to maintain exploration and that Mexico's production in the last 8 years totaled about 320,000,000 bbl.

Southern Chile Wildcat Shows 8,000 Bbl. Daily

SANTIAGO, Chile.—Chile's Spring Hill wildcat on the Straits of Magellan—the world's most southerly oil well—has shown a daily potential of about 8,000 bbl. in complete tests.

The well, drilled to about 7,500 ft. by J. K. Livermore Corp. of Lubbock, Tex., under contract to Chile's government oil administration, Compania de Fomento de la Produccion, first indicated a daily potential of about 2,900 bbl. of 29° A.P.I. gravity oil. The higher potential came from subsequent tests which placed gravity of the oil at 33°.

Commercial production in the remote area on Tierro del Fuego archipelago will make Chile the eleventh producing country in South America. Chilean officials hope development will result in at least enough production for domestic needs.

The Spring Hill test and another well were started after a survey of the area by United Geophysical Co. under the direction of Glen M. Ruby. The second well is the Mina Rica test west of the Straits.

Army Finishes Airfield At Dhahran in Arabia

DHAHRAN, Saudi Arabia.—A new airfield which will facilitate travel to this Persian Gulf oil area has been finished by the United States Army.

Americans are teaching Arabs to operate the new Dhahran field. Under the guidance of oil company interests, nationals are learning metal welding, electrical wiring, motor winding, operation of lathes and similar equipment.

Before Arabian American Oil Co., the jointly owned subsidiary of Standard Oil Co. of California and The Texas Co. began developing this area, Dhahran was in a nearly unknown desert country. Now oil workers play softball under floodlights, have a soda fountain and other conveniences. Buildings compare favorably with the best United States Government housing projects.

Production in Punjab Continues to Decline

Fields in Punjab province in northwestern India are continuing to show the decline in production which began after peak production was reached in 1941.

The area is exploited by Attock Oil Co. and yields a heavy asphaltic oil. Production in the first 9 months of 1945 is placed at 243,837 bbl. and for the entire year at 350,000 bbl. In the flush year of 1941, output amounted to 886,000 bbl. In 1942 it dropped to 781,000 bbl., in 1943, to 595,000 bbl., and in 1944, to 411,000 bbl. Hopes of raising production stem from reports from the Joya Mair field where two wells on short tests produced at a rate of more than 9,000 bbl. daily. Plans for a third well to provide data to assess the field's possibilities are being made.

Victor Butler Named British Oil Attache

Victor Butler has just been named petroleum attache for Great Britain and will be stationed in Washington. During the first and second joint conferences on the drafting of the Anglo-American petroleum treaty, Butler actively participated in both. First a member of the British committee, at the working level, Butler later was a member of the British delegation headed by Lord Beaverbrook (who signed the first oil treaty in Washington in 1944), and later served on the British delegation, headed by Emanuel Shinwell, when the treaty now pending before the U. S. Senate, was signed at London in 1945.

Butler served as secretary of the British Oil Control Board during the war. This was a cabinet subcommittee.

Pemex Drilling Two Tests

McALLEN, Tex. — Two new gas-distillate wells are being drilled by Petroleos Mexicanos, Mexican Government oil monopoly, about 40 miles southwest of McAllen. The company already has two producers in the area. The Mission structure is an extension of the Penital field of Hidalgo County, Texas.

Three Central American Republics Favorable to Foreign Capital

by Curtis Vinson

MEXICO CITY.—Three of the six Central American countries — Nicaragua, Costa Rica, and Panama— hold more or less favorable positions in the growing postwar search for new oil production in Latin America by reason of their open-door policy toward the operation of foreign capital. As yet the governments of these three nations have not enacted legislation proscribing the activities of foreign interests—meaning particularly in this case United States oil interests — within their domains.

To date none of the three has become an area of any particularly avid activity on the part of foreign oil capital. But their tacit invitation to the entry of foreign capital through the nonexistence of nationalistic legislation contrasts interestingly enough with the barriers against outside capital erected by Mexico and Guatemala.

In Nicaragua, Gulf Oil Corp. is carrying on an exploratory program under contract with the government. Observers recently in Panama report that the government of that country is not only favorable toward but would welcome exploration by outside capital. One U. S. company is reportedly planning a survey in Panama. Little if any activity is going on in Nicaragua but the existing policy of that country is not of a discriminatory nature toward foreign capital.

Of course, this open-door policy, this policy of welcoming foreign capital, existed in the past in Mexico, in Guatemala, and in other countries. Mexico's abrupt aboutface came in 1938 when the leftist Cardenas administration not only took over, lock, stock, and barrel, the foreign oil holdings but enacted legislation that, unless it is modified, may be expected to keep foreign oil capital out of the country forever.

Following in Mexico's footsteps, Guatemala, in Article 95, of its new constitution, adopted in March 1945, after overthrow of dictator Jorge Ubico, laid down the thesis that only Guatemalan capital may exploit the oil resources of the country. With oil legislation patterned after that of Mexico, Guatemala quickly lost any interest its potentiality as an oil-producing country might have had to enterprising foreign capital. It is known that an oil survey has been made in Guatemala. What it disclosed and what comes of it is now apparently the interest of Guatemala alone.

For the time being—and, so say foreign oil representatives, until existing policy is changed—Mexico has been bypassed by foreign capital in the program to find and develop new oil reserves in Latin America. Several U. S. companies which have invested heavily in Venezuela and Colombia in recent years, are widening the search in South America. Representatives of these companies frankly declare that the picture would have to change materially in Mexico before their companies would be interested in new or renewed investments.

Independent Operation at End

Independent operation in Mexico is just about at an end. A few independent companies operating at the time of expropriation were unmolested by the nationalistic policy adopted. But their operations have been withering slowly on the vine. For one thing, there is no market for their production except Petroleos Mexicanos (Pemex), the government-controlled industry. This precludes any competition in marketing their oil. Drilling permits furthermore are wholly within the discretion of Pemex.

Two of the largest companies operating in Mexico at the time of expropriation that were not taken over were Mexican Gulf (subsidiary of Gulf Oil Corp.) and New England Fuel & Oil Co. (subsidiary of the Magnolia Petroleum Co.) Early in 1945 the New England properties were sold to Paul Bush of Mexico City. These included nine wells in the Panuco field. Mexican Gulf continues to maintain offices in Mexico City and in the field and its production goes on. When its storage facilities are filled it faces the question of selling to Pemex or shutting down its wells.

There are in the country, according to well-informed sources, some 51 independents, but these are, for the large part, small producers with output ranging from 10 to 100 bbl. a day. Most of these are operating in the Panuco district and unless their production is tapped by Pemex pipe line they have to deliver their oil to Pemex storage or refinery.

Some of these independents are Americans, some Mexicans. One of the largest Mexican independent companies is that of Muñoz and Martinez who have been developing natural-gas production in northeastern Mexico. They have production in the vicinity of Mier, state of Tamaulipas, just south of the Rio Grande.

Russia Reported Wringing New Grant From Hungary

BUDAPEST.—Russia is reported to be using a confiscated German oil concession as a means of gaining further entry to Hungarian oil through a joint Soviet-Hungarian company.

Sources here said an agreement setting up the exploitation monopoly company is due to be signed in the near future. Under its terms, according to reports, the Soviets are putting up the German Winternhall Co.'s concession in Hungary which became Russia's property through the Potsdam agreement. On the other hand, Hungary as its share in the joint company is providing another large concession area in the Hungarian plain, two Hungarian-owned refineries, and exclusive rights from the Hungarian Government to the new company to exploit these territories. American and British informants here said the maneuver amounts to a "squeeze play." The company also is to have a Hungarian president with no executive powers, but a Russian general manager.

Australian Supplies Are Still Restricted

NEW YORK.—Gasoline supplies for Australia are still being alocated by the Overseas Supply Committee, in London, according to a well-informed source here who states that the termination report regarding Australian gasoline rationing is "premature."

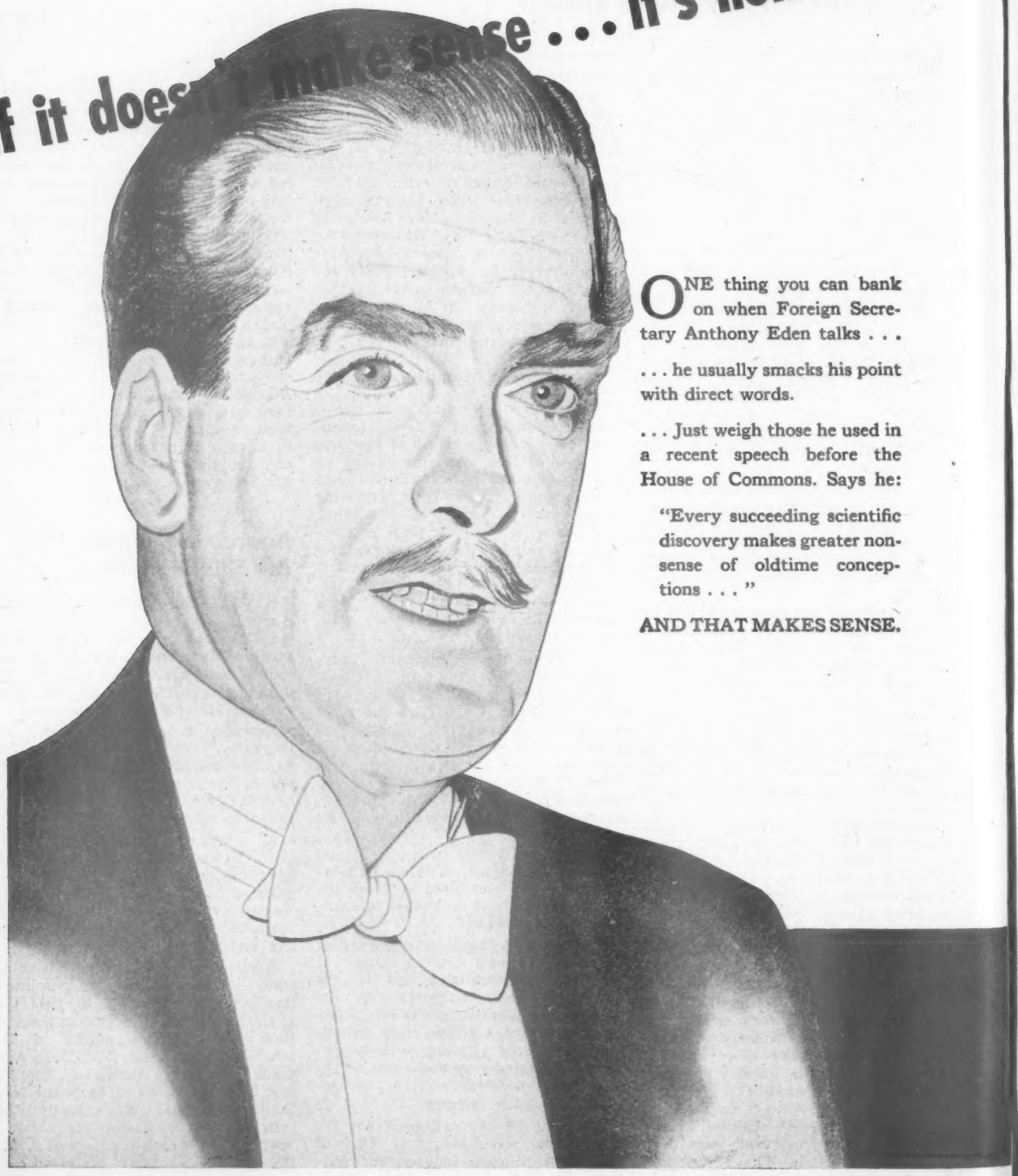
However, it is understood that the Overseas Supply Committee, which handles gasoline distribution for the entire Sterling area, will terminate gasoline rationing there sometime in the near future.

A newspaper report here stated that Caltex, Ltd. (Standard Oil Co. of California and The Texas Co.) planned to supply Australia with sufficient gasoline — from the Bahrein area—to terminate Australia's rationing program.

Australia's production of power alcohol—as a substitute for gasoline—has been discontinued. In 1942 this country planned the construction of four power-alcohol plants in the wheat-growing areas of southern Australia, western Australia, Victoria and New South Wales. Only the New South Wales plant was actually used, remaining in operation for about a year during which time about 2,000,000 gal. (U.S.) were produced.

then he said to himself

If it does[illegible] make sense . . . it's nonsense



ONE thing you can bank on when Foreign Secretary Anthony Eden talks . . .

. . . he usually smacks his point with direct words.

. . . Just weigh those he used in a recent speech before the House of Commons. Says he:

"Every succeeding scientific discovery makes greater nonsense of oldtime conceptions . . . "

AND THAT MAKES SENSE.

Proposed Bill Would Establish Spacing Regulations in Kentucky

by Herndon David

DESIROUS of providing a means to assure orderly drilling and development since the dissolution of Petroleum Administration for War, the Kentucky Oil and Gas Association has presented to the Kentucky Legislature a bill vesting in the state geologist full authority to control all wells to be drilled for oil or gas in that state. The bill requires permits for the drilling of oil or gas wells, establishes spacing regulations for such wells, provides for the consolidation of leases for spacing purposes, and sets up penalties for the violation of provisions of the act.

The purpose of the act is to protect the correlative rights of landowners and others having the right to search for and produce oil or gas by preventing the drilling of wells at such locations as to cause drainage from adjoining lands, unless such drainage is offset by counterdrainage. The majority of Kentucky operators would welcome such legislation since it would prevent the wasteful but sometimes necessary 10-acre spacing that prevailed before PAW control was established.

Drilling Permits

The bill provides that after enactment, no person shall drill an oil well without first obtaining a drilling permit from the state geologist. In order to obtain such a permit, the operator must file on a prepared form an application for permit to drill. This application must contain the following information:

(a) The name and address of the operator and each producer having an interest in the well.

(b) A description of the lease on which the well is to be drilled showing the number of acres contained in the lease.

(c) The approximate depth to which the well is to be drilled and the horizons expected to be penetrated.

(d) Whether the well is expected to be an oil or gas well.

(e) Information as to spacing and allocation of acreage concerning any other wells drilled or drilling on the same lease or any contiguous leases.

(f) The application must be accompanied by a map or plat showing the boundary lines of the lease on which the well is to be drilled, the location of the proposed well, and any other pertinent information required by the state geologist.

According to the bill, the state geologist would either issue a drilling permit or deny the application within 5 days after its receipt. If the permit be denied, a written notice would be given the operator of the proposed well stating the reasons for denial. All permits would expire 90 days from the date of issue unless operations for the drilling of the well had actually commenced within that period. After expiration, a permit would become void and the operator to whom it was issued would be required to surrender it promptly to the state geologist.

Spacing of Oil Wells

The nature of oil-bearing formations and the varying characteristics of oil-bearing formations in different areas of Kentucky make it undesirable to establish spacing units for all oil wells. The bill, therefore, concerns itself only with those drilled within specified distances from the boundary of separately owned tracts of land. In order for a permit to be issued, the location of an oil well on the lease on which it is to be drilled must conform to the requirements shown in Table 1. However, any well commenced with the intention of drilling primarily for oil to any shallow depth which proved to be dry, could be drilled to lower horizons provided the state geologist and adjacent lease owners were notified.

Spacing of Gas Wells

The characteristics of gas-bearing formations in Kentucky are such that spacing units for all gas wells are necessary and the bill, therefore, sets forth spacing units of minimum area for all gas wells to be drilled after enactment. Such wells should be at least 330 ft. from the nearest boundary line of the lease and at least 1,320 ft. from any other gas well then producing, drilling, or for which a drilling permit had been issued. Exception to this rule is made in that an offset well on an adjoining lease could be drilled provided it were at least 330 ft. from the common boundary line and complied with other provisions.

A 40-acre spacing unit is proposed for wells located east of the Cincinnati Arch which are to be completed in the Berea sand or any horizon between the top of the Niagara lime and the Berea sand. The same unit is proposed for wells located west of the Cincinnati Arch which are to be completed in the Beaver or any formation above the Beaver. All gas wells to be drilled in these two areas below these depths would require a spacing unit of at least 100 acres.

The spacing requirements set forth for both oil and gas wells will not apply to wells to be drilled in accordance with a secondary-recovery program. Exception may also be granted if consent in writing is filed with the state geologist and signed by all producers owning the entire working interest in the leases which adjoin the lease on which the proposed well is to be drilled, and which have a boundary nearer to the proposed well than the minimum specified distance.

Consolidation of Leases

Producers owning the entire working interest in two or more adjoining leases are allowed by the bill to consolidate all or contiguous parts of such leases provided they have an agreement with the owners of the entire royalty interest in the leases. In many cases it may be necessary to consolidate leases in order to drill a well deemed necessary for the efficient drainage of two or more leases. In such a case, should any royalty owner refuse to join with the producers in the agreement for consolidation, the bill provides that the producers may file an application and effect a hearing concerning the matter. In accordance with findings of the hearing, the state geologist could issue an order either approving the consolidation or dismissing the application. If an order for consolidation were issued, it would allocate to each unit a fair and equitable portion of the oil and gas produced in proportion to the acreage in the consolidation tract.

Other sections of the bill provide that drilling logs shall be kept of all wells and submitted, along with a copy of any electrical survey, to the state geologist within 180 days after completion of a well; that any well drilled or drilling before the date of enactment shall not be subject to the provisions of the bill, and that penalties ranging from $50 to $5,000 may be imposed on operators for violation of provisions of the bill.

TABLE 1—SPACING REGULATIONS FOR OIL WELLS AS PROPOSED BY BILL

	Sand wells			Lime wells		
	Under 650 ft.	650-1,600 ft.	Over 1,600 ft.	Under 1,000 ft.	1,000-1,600 ft.	Over 1,600 ft.
Distance from nearest boundary line	150 ft.	200 ft.	300 ft.	150 ft.	200 ft.	300 ft.
Distance from nearest well along boundary line producing from same horizon	300 ft.	400 ft.	600 ft.	300 ft.	400 ft.	800 ft.

Dependable—Portable—Accurate

NORTH AMERICAN GRAVITY METER

Simplifies, Speeds-up Gravity Surveying

Crews like to work with this gravity meter. They are spared all the transportation difficulties common to bulky, heavier meters. With the North American Gravity Meter mounted in the back seat of sedan or small "jeep" numerous on or off-the-road readings can be made simply by driving the car to location and extending the tripod through the car floor. When working in areas impassable by car, the Gravity Meter can be quickly and easily lifted from the car and taken to location by one man on the backpack. In swampy territory or water locations, the Meter can be carried in a canoe or boat.

Its high degree of accuracy has been proved by surveys made by our own and independent crews. Its trouble-free, dependable service is demonstrated by the fact that many of them have never required repairs or servicing even after long periods of operation in the field.

Our enlarged laboratory staff is now able to produce North American Gravity Meters for immediate sale to foreign operators. It is the ideal Meter for these operations.

The North American Gravity Meter and typical field scenes of transportation and operation. The meter with batteries and backpack weighs only 45 pounds.

NORTH AMERICAN GEOPHYSICAL CO.

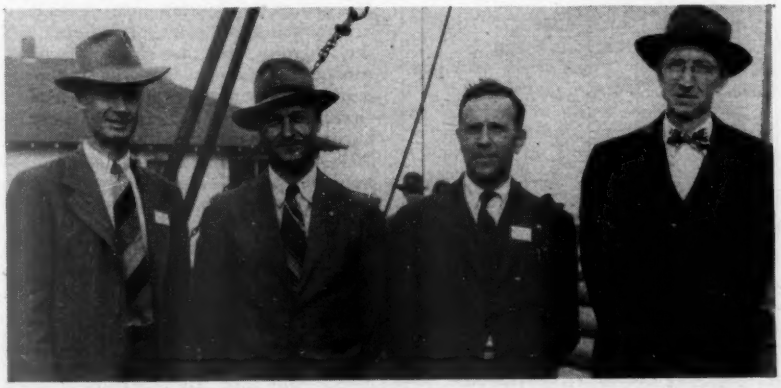
Five-day short course in Well Logging Methods leads off on first day with a field demonstration in college water well of radioactivity logging, by The Lane-Wells Co., Houston. Well is 1,267 ft. deep

Vets Attend Short Refresher Course in Well Logging

by E. H. Short, Jr.

COLLEGE STATION. — The short course in well-logging methods, conducted by the petroleum engineering department, Texas A. & M. College, ended here March 15 after 5 days of lectures and round-table discussions.

This series of lectures, planned by Harold Vance, head of the petroleum engineering department, and assistant, A. B. Stevens, was intended primarily as a refresher course in well logging which would be of special benefit to returned service men. The unqualified endorsement given the course by the oil industry as a whole is evidenced by the fact that oil-company representatives attending the lectures were composed both of returned service men as well as those who were on the job during the war. The 5-day well-logging course was attended by over 175 engineers, geologists, consultants, physicists, and superintendents from Texas, Louisiana, Oklahoma, Wyoming, Pennsylvania, and Mississippi. The greatest distances traveled to attend the conference were by Bill McKay, Dowell's representative from Calgary, Canada; and Felix Mendoza, director of Colombian petroleum department, from Bogota.



John Campbell, Lane-Wells Co., Houston; A. B. Stevens, assistant head of the Texas A. & M. petroleum engineering department; Hubert Guyod, well logging consultant, Houston; and Harold Vance, head of the A. & M. petroleum engineering department

The course consisted of 12 lectures delivered by outstanding authorities upon each well-logging method. Hubert Guyod, well-logging consultant of Houston, led the conference and four of the lectures were delivered by him.

The term well logging implies the recording of any obtainable hole information which might contribute toward maximum economic and mechanical success in completion and subsequent operation of a well.

Modern methods, involving electrical logging, permeability logging, radioactivity logging, caliper logging, mud logging, mechanical logging, geochemical logging, temperature logging and formation dip determination, were discussed at length during the conference lectures and also during round-table discussions held each evening.

In opening the conference, Guyod pointed out that no universal logging method is available, and also that only a limited number of problems can be solved with any one given method. According to Guyod, of the many logging methods which have been tried, only about one-fourth of the total (as shown in Table 1) are widely used. In Fig. 1 he presented some interesting figures showing approximate logging cost in terms of total depth.

Electrical logging was presented to the group in lectures which touched all phases of the work, both by Guyod and H. C. Waters, Halliburton Oil Well Cementing Co. For the benefit of beginners, Guyod thoroughly reviewed the basic fundamentals involved in electric logging. Using the flow of water as an analogy, he presented a diagram of a typical hydraulic circuit, along with the diagram of an analogous electric circuit. The principle of resistance measurement in a bore hole was then explained by chart, and this was followed by a diagram of a logging truck with the electric-logging instrument in the hole. At this point he gave an explanation of the electrode and circuit arrangement for resistance measurement, progressing in several steps to a discussion of the electrode and circuit arrangement for potential measurement in a well. He concluded the lecture with a description of ideal electric logs embodying all common formations. Several engineers without background in electric-logging

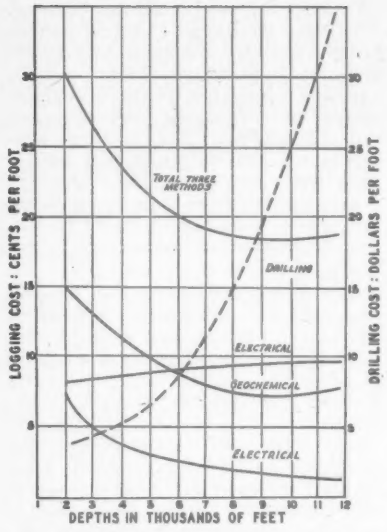


Fig. 1—Approximate logging cost in terms of depth

TABLE 1—WELL-LOGGING METHODS
By Hubert Guyod

Method—	Type—	Properties investigated, use—
Acoustic	Sound intensity	Cohesion
	Sound velocity	Elasticity—Density
Chemical	Insoluble residues of samples	Mineral content x
	Hydrocarbon content, samples	Hydrocarbon content xx
	Gas detection in mud	Gas content xx
Electric	Natural potential	Electrochemical properties (?) xxx
	Secondary potential	(?)
	Formation conductivity	Salt water content—Texture xxx
	Mud conductivity	Salt content x
	High frequency response	Dielectric constant—Conductivity
	Polarization	Electrolytic properties, Dielectric constant
	Transients	Misc. electric properties
Gravitational	Gravity	Density
Intake	Water or gas intake	Permeability x
Magnetic	Susceptibility	Effect of terrestrial field
	Retentivity	Effect of artificial field
	Retentivity decay	Coercive force
Mechanical	Hole calipering	Brittleness—Solubility xx
	Drilling rate	Hardness—Compactness xx
	Drilling reaction	Hardness—Compactness—Texture
Optical	Examination of formations	Color—Texture
	Examination of samples	Color—Texture—Content xxx
	Fluorescence of formations	Oil content
	Fluorescence of mud	Oil content xx
Radioactive	Natural radioactivity	Radioactive substance content xx
	Artificial radioactivity	Hydrogen content xx
Seismic	Wave velocity	Elasticity—Density
Thermal	Gradient	Thermal conductivity
	Thermal evolution	Brittleness—Solubility—Gas expansion x

No (x) not used; 1 (x) little used; 2 (x's) frequently used; 3 (x's) considerably used.

work commented that the excellent groundwork on fundamentals laid by Guyod enabled them readily to understand the advanced lectures on electric-log interpretation which followed.

Formation Dip Determination

The lecture by E. F. Stratton, Schlumberger Well Survey Corp., on the electrical device for determining formational dip received attentive interest. Of the instruments and devices discussed, this is perhaps the most recently developed. The device for running into the hole is composed essentially of three separate electrodes, compass, and camera. Dip determinations are made by measuring self potential by means of the three electrodes, and any inclination of the well together with the position of the electrodes in respect to the compass are recorded by a camera using 35 mm. film. The possibilities for determining valuable development information through the use of this device are obvious.

Lester Swan, with the assistance of Ralph Smith, both of Dowell Incorporated, gave a lecture on permeability surveys and water logging, which progressed in logical sequence from the elementary considerations to the involved problems solved through these types of surveys. Schematic diagrams showing the dissimilar metal electrode unit, electric cable, and meter were presented on the blackboard and the exact manner in which electrical water-location surveys worked were brought out by other diagrams showing case examples of actual subsurface conditions. The interest of the group in permeability surveys through the use of Dowell's electric pilot was evidenced by the questions put to Swan during the course of his lecture. The mechanics of making permeability surveys were illustrated by Swan on the blackboard. For the benefit of engineers who had not been directly connected with work of this type he brought out that the electric pilot permeability survey is not used to obtain information pertaining to porosity, saturation, or fluid content. Rather, it is used quite successfully to determine the position and thickness of permeable zones in a well and their capacity to take fluid. The data obtained through the use of the electric pilot permeability survey when combined with other well information will often assist in determining the fluid content of such zones. Numerous illustrations were presented by Swan, in order to acquaint the group with case examples of this type of work under various well conditions.

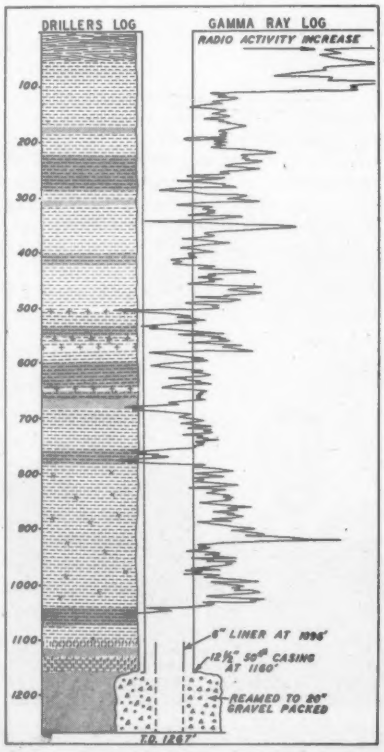


Fig. 2—Record obtained on demonstration of radioactivity logging

Radioactivity Demonstration

Lectures on radioactivity logging were made by John Campbell, The Lane-Wells Co., and concluding the course was a demonstration of this type of logging in A. & M. College Water Well 6. The record obtained is shown in Fig. 2. At the outset of his lecture Campbell explained to the group the fundamental facts governing the application of radioactivity well logging. He pointed out that radioactive material in varying concentration is present in all rocks and that the most penetrating of the rays emitting therefrom is the gamma ray. Also, that these rays are capable of penetrating as many as five concentric strings of casing. Since gamma-ray intensity has been found to be relative to the formations it has offered an extremely valuable means of identifying formations even with the casing in the well.

Campbell explained the mechanical construction of gamma-ray instruments and also the instrument used for obtaining the neutron curve. The neutron curve is obtained to complement the gamma-ray record, since sandstones and limestones are re-

corded as minimum values by the gamma-ray. A minimum value on the neutron curve indicates sandstone and a maximum value dense limestone. The many applications of these surveys were explained.

One of the most valuable developments during the past 8 years or so is the means of determining hole size. The bore-hole information obtained with the Halliburton caliper instrument has undoubtedly saved many engineers the embarrassment, or worse, which often happened when a string of tubing was cemented in a hole because of the lack of knowledge pertaining to bottom-hole size.

H. C. Waters, Halliburton, lectured on caliper logging and electrical logging. The operation of the caliper instrument was explained and its many applications illustrated by blackboard diagram and slides.

Lectures on mud logging, by B. O. Pixler, Sales Division, National Lead Co., and mechanical logging by P. B. Nichols, Cities Service Oil Co., held the interest of the group during the Wednesday afternoon session.

Geophysical Well Logging

The possibilities for obtaining advance notice on the accumulation of oil-bearing horizons through the use of geochemical logging methods, as discussed by Leo Horvitz, Horvitz Laboratories, Houston, was accorded much interest.

The application of geochemical-well logging, according to Horvitz, is to predict in advance of the drill, the possibility of encountering gas or oil accumulations. Slides were shown of field cases where the hydrocarbon analysis of cuttings predicted oil-bearing formations from 750 to 1,800 ft. before penetration by the bit. He also explained that geochemical well logging was being used in conjunction with other methods, such as electrical or radioactivity, in determining possible productive formations. In this connection he mentioned that its greatest value is in pointing to zones which should be cored by sidewall sampling devices.

Horvitz also brought out that in this type of logging the general procedure is to collect a pint jar of well-washed cuttings for each 30 ft. of hole. The laboratory analysis of the gas extracted from the samples involves the combination of low-temperature fractionation (at low pressure) and combustion methods. Gas is separated in three separate fractions: methane, liquid nitrogen, and pentane and heavier hydrocarbons. The proximity of oil is indicated by a significant increase of total hydrocarbons contained in the sample when the predominating hydrocarbon fraction is that of pentane and heavier hydrocarbons.

An example was cited by Horvitz where the derrick had been torn down after a well had been carried to its originally proposed maximum depth. Hydrocarbon analysis of well cuttings indicated the presence of an oil-bearing formation only a short depth below the point where drilling had been suspended. The derrick was rebuilt and after drilling approximately 500 ft. the well was completed as a distillate producer.

Sales by Service Stations Rise 14 Per Cent in 1945

WASHINGTON.—The sharp upturn in gasoline consumption immediately following the end of the war in the Pacific is reflected in a Department of Commerce report on total dollar volume of sales by service stations in 1945.

Sales of filling stations last year totaled $2,978,000,000 — 14 per cent above 1944's total of $2,603,000,000. Sales in the last prewar year of 1941 were $3,454,000,000. Peak for 1945 came in October when the sales volume was $288,000,000; low month was February with $190,000,000.

Caustic Soda, Acid Plant Planned in Midland Area

MIDLAND, Tex.—A new $500,000 electrochemical plant is to be built near here to produce hydrochloric acid and caustic soda for use in West Texas' producing and refining industry.

Construction is scheduled to start soon with completion by the end of the year. The plant will be operated by Frontier Chemical Co. which was recently incorporated by Robert L. Wood, Curtis W. Cannon, and H. E. Chiles, Jr. Present plans call for a plant with a daily capacity of about 25 tons of concentrated hydrochloric acid and about 10 tons of caustic soda. Salt will be drawn in liquid from underground strata in the Permian basin and converted electrochemically into the two products.

Kentucky Tax Fought

LOUISVILLE, Ky. — A proposed bill in the Kentucky legislature to levy an additional 1-cent a gallon tax on gasoline and a 1-cent a quart on oil for the state's general fund is meeting mounting opposition from automobile club officials who say it would drive motorists into neighboring states to make their purchases.

Gulf Producing Gets Loan

NEW YORK.—Texas Gulf Producing Co. has borrowed $2,500,000 at 2½ per cent interest from Guaranty Trust Co. of New York, planning to use $1,916,000 of the sum to purchase 10,119 shares of Ohio Fuel Supply Co., a producer and seller of crude and natural gas, according to an announcement made here. The loan will be paid in installments running until February 1, 1954.

DEATHS

Charles E. Graff, 83, retired executive of Standard Oil Co. of New Jersey, died March 14 in Jersey City, N. J. At his retirement in 1934, he was vice chairman of the manufacturing committee and had been connected with Standard Oil for 42 years. He was superintendent of Standard Oil's Eagle Works in Jersey City from 1895 until 1914 and later was superintendent of the Bayway plant in Elizabeth, N. J.

Henry J. Garden, 49, Hutchinson, Kans., independent operator, died March 14 in Kansas City.

S. C. Massengill, retired oil operator and a member of the crew that drilled the Clayco Co. wildcat in 1911 to open the northwest Texas field, was found dead in his home in Electra March 14.

Charles S. Van Tine, 64, Pennsylvania oil producer, died March 14 in Bradford, Pa.

Delmar G. Hisey, 50, scout in the Ardmore, Okla., district for Gulf Oil Corp., died March 14 in Fort Worth. He had been a member of the Gulf Oil organization for more than 25 years.

R. H. Featherston, 55, driller and production foreman who had been employed for the last 25 years by Burr Lambert, Evansville, Ind., contractor, died March 14 in Wichita Falls, Tex.

Gerald B. Wood, 61, Pennsylvania oil producer, was found dead in his home in Bradford March 9.

Roger A. Howe, 55, vice president and general manager of McKamie Gas Cleaning Co., died March 11 in Magnolia, Ark.

Clarence T. McCool, 47, former Pennsylvania oil producer, died March 12 in Clarendon, Pa.

Julius Zaetschky, 71, active in Alberta oil development since 1928, died recently in Calgary. He was president of Keho Domes Oils and associated companies.

N. W. Shiarella, 48, member of the firm of Miller & Shiarella, Owensboro, Ky., died March 14 in Owensboro. He was vice president for Kentucky and a director of the Independent Petroleum Association of America; Kentucky representative on the Interstate Oil Compact Commission; and a member of the executive committee of the National Stripper Well Association.

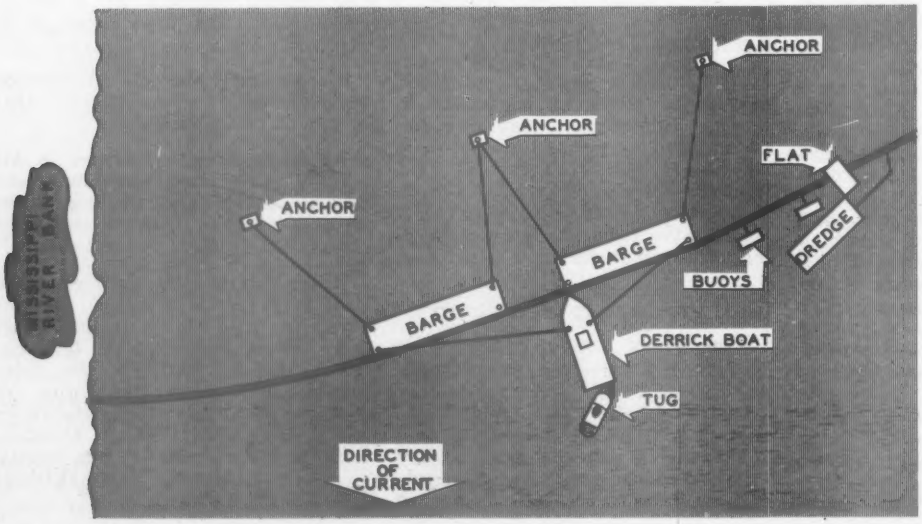
Unusual Problems Solved in Repairing Pipe-Line River Crossing

by William J. Wilkins

This article describes how repairs were made on a 10-in. acetylene-welded crossing built 15 years ago. Some ingenious methods were devised, which greatly facilitated the work, and reduced the expense. The author is chief engineer, Tulsa Pipe Line Division, Gulf Refining Co.

CONSIDERABLE progress has been made in recent years in methods used to repair submarine pipe-line crossings on major streams. In the not too-distant past a line failure of any kind on a Mississippi River crossing usually resulted in an unsatisfactory repair job or retirement from service. Repair of a crossing in this type of service is relatively expensive because of the equipment required, but when compared with the cost of a new crossing, will prove to be economical. Quite often relatively new line crossings, will develop mechanical failures, the repair of which will be equivalent to construction of a new crossing. In general, a crossing can be repaired for from 15 to 25 per cent of the cost of a new crossing.

The line repairs to be described in this article were made on a 10-in. acetylene-welded crossing constructed across the Mississippi River in 1930. At that time no dredging was done, but in 1937 this crossing and an adjacent crossing were lowered by dredging to depths specified by the



Top of page: Pulling slack loop in Somastic-coated pipe section preparatory to lining up for welding

Left: Dredge stripping line followed by derrick boat lifting line. Pipe is supported by wire-rope slings suspended from barges. Steel flat is used for sounding and attaching slings

governmental authority in charge of navigation and stream control.

As lowering was completed the location of the lines was accurately mapped by transit-line intersections from permanent triangulation points established on the river banks. An accurate profile was also determined by soundings at these intersection points. This information proved to be of great value in later repair operations. For the small expense involved, an accurate record of this sort can be recommended for any crossing. It is true that there are several pipe-line finders on the market, but experience has shown that it is difficult to locate a line at depth of 30 or 40 ft. with 15 or 20 ft. of soil cover on the line. Lack of this information has resulted in considerable expense on some repair jobs.

The author has had experience with major repairs to the above-mentioned crossing in 1942 and in 1945. Repairs had been made to crossings on this stream prior to 1942, but it is believed that none had been repaired above the water surface by the method to be described. Since then several companies have repaired crossings, using the method developed at that time.

Soon after the crossing was lowered by dredging, piling fences extending out into the stream approximately 600 ft. were constructed above and below the line. These structures proved to be an aid to river traffic by keeping the channel open, but created maintenance problems on the adjacent line.

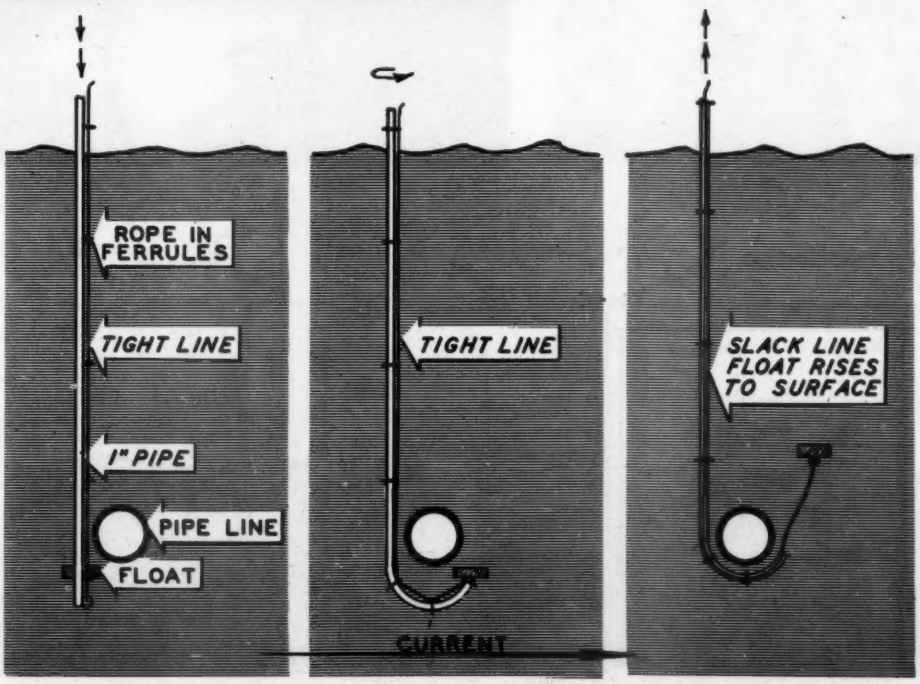
In January 1942 a sudden rise in the river stage created a scour area below the channel end of the fence on the upstream side of the line that left it swinging off the bottom for 180 ft. The vibration due to the swift current caused the line to part in what proved to be defective welds at each end of a 40-ft. joint, 680 ft. from the river bank. Water depth in the scour area ranged from 38 to 52 feet, with a maximum depth on the pipe line of 44 ft.

The first step in the repair operation was to dredge the river-bottom cover off the line to provide sufficient slack for raising the line. Dredging began at a point 265 ft. from the bank and was continued to a point 1,040 ft. from the bank for a total distance of 775 ft. The dredge suction was located on the initial point from the previous location information and uncovered the line for definite location in 30 minutes without moving the dredge suction.

A diver was first employed to pass a small line under the pipe to pull slings around for raising the pipe. This practice was discontinued when the diver was unable to work in the

Above, left: Diver ascending to surface after passing line under pipe line

Above, right: Initial pull on pipe section removed for replacement



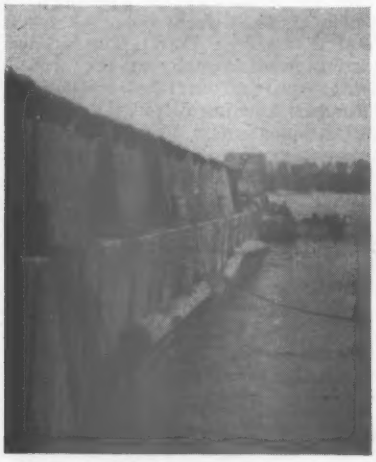
Right: Wood block is retrieved at water surface and the 1-in. pipe section is removed. Wire-line slings are then pulled under the pipe to the surface with small line

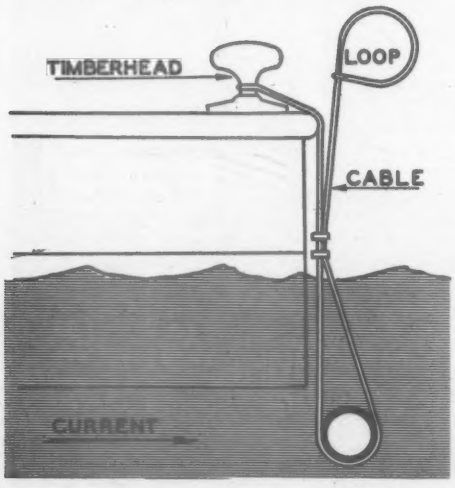
current beyond the end of the piling fences. Other methods of performing this operation were tried with varying results. The best method developed for getting a line around the pipe in swift current was to tie one end of a ¼-in. rope to a 10 or 15-lb. rock and drop it in the water above the line. The dredge suction was swung under the line where the rock was pulled into the suction pipe. The suction pipe was then swung out from under the line and raised to the surface where the rock was retrieved. Larger double-eye cables can then be pulled under the pipe. On the more recent repair, a time-saving method of getting slings under the pipe in still water between the piling fences was developed that did not require the use of a diver or dredge.

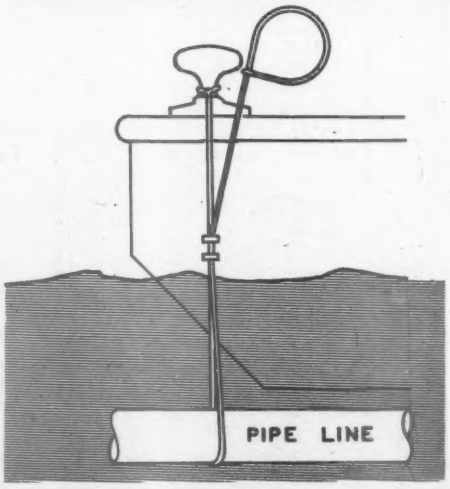
A sufficient length of 1-in. pipe with a bent section on one end that will hook under the pipe line is used. Eyebolts are welded on the side of the 1-in. pipe at a right angle to the bent section. A ¼-in. rope with a 6x6-in. wood block tied to one end is threaded through the eyebolts and the wood block pulled up snug against the end of the bent pipe section. The assembly is lowered into the water below the bottom of the pipe line and turned, pulling the bent section up under the pipe. The free end of the rope is released at the surface and slacked off, permitting the block to float to the surface. The 1-in. pipe assembly is then pulled out and the cable sling pulled under the line as before. The description of the above methods used to pass slings under a submerged line may sound rather elementary, but this is one phase of the operation that can be expensive and time consuming, especially when working in a 7 m.p.h. current. The operations can be completed by two men working from small steel pontoons ahead of the larger lifting equipment. Wire-line slings can be tied to empty steel-drum buoys until ready for use by the derrick boat.

Cable slings carrying the pipe during lifting operations are suspended from steel barges 100 ft. or more in length held in position parallel to the line on the upstream side by concrete block anchors. One eye of the sling is passed over a barge timber head while the other eye is left free to hook on to the derrick-boat line for lifting. After the initial lift on a sling, the timber-head side and lifting side are clamped with wire-line clamps to hold the lift. Subsequent lifts are made by taking a strain on the free end of the sling and loosening the wire-line clamps, allowing the cable to slip through the clamps. When the desired lift has been made, the wire-line clamps are again tightened and the derrick line slacked off and unhooked.

A derrick boat with a long boom swinging in an arc should be used for handling the pipe. This will eliminate excessive maneuvering of the derrick barge. Several lifts were taken on the pipe to eliminate strains or kinking. Anchoring of the steel barges on the upstream side of the pipe permits free movement of the derrick boat on the downstream side of the pipe with no anchor lines to obstruct movement. The derrick barge was equipped with power-driven winches on each corner of the forward end. These lines were tied to barge timber-heads which speeded up lateral movement of the derrick boat to the various sling positions by slacking off on one winch line and taking up on the other.







Left, above: Pipe line suspended and lined up ready to be welded to new section to be pulled in from bank

Above: Somastic-coated pipe section being pulled into stream for welding to pipe line suspended from steel barges

Left: One loop of wire-rope sling is supported on barge timber head. Free end of sling is attached to derrick line hook for raising pipe when clamps are loosened

In all, five barges were used to carry the suspended pipe. A sling was used at each end of the barge and in the center with barges spaced about 50 ft. apart. By this means approximately 750 ft. of pipe was suspended without undue strain. About 250 ft. of pipe was exposed above the surface. Fortunately due to the double-belled pipe used in the crossing, the line was held together by river clamps at both breaks. The line was lashed to flat pontoons on each side of the breaks. The line was cut and beveled beyond each break and a new 45-ft. joint of pipe welded into the line to fill the gap.

When welding was completed the line was tested by turning the oil stream through before lowering to river bottom. The entire suspended line section was lowered in, in a single operation. The free ends of the slings were wrapped around the barge timber-heads, the cable clamps were removed and the line was lowered by slacking off cable around each timber-head. The entire lowering operation required about 15 minutes. The line was sounded for contour and profile, which completed the job.

In the period between 1942 and 1945 considerable silt was deposited between the piling fences where there had originally been several feet of water. A corrosion leak occurred near the bank where drift covered with silt had lodged against the line. This was repaired by replacing a 400-ft. section with Somastic-coated pipe. The same procedure was used to uncover the line and raise it for repairs as was used in the previous case, except for one departure necessitated by the character of the cover deposited on the line. This overburden was of such a plastic nature that excessive caving prevented uncovering the line by dredging. Several feet of cover were removed from the line for a distance of 300 ft. on the shore end by a clam-shell bucket rigged on the derrick boom. Since several feet of cover still remained on the line, the pipe was cut at the bank and pulled up through the mud by use of double blocks rigged on the derrick boat. The line was freed by dredging to provide slack on the river end. The pipe was raised and cut at a point 435 ft. from the bank. A section of pipe coated with Somastic for protection in the bank and in the silt area was pulled in by the derrick boat and welded to the open end of the line. The line was again tested before being lowered in the same manner as before.

The same results could probably have been achieved in this latter case by dredging out into the stream to provide sufficient slack to raise, cut the pipe, and abandon the shoreward end without attempting to recover any pipe. This procedure would probably be advisable should similar conditions be encountered as it might not be possible to raise the pipe through the mud overburden.

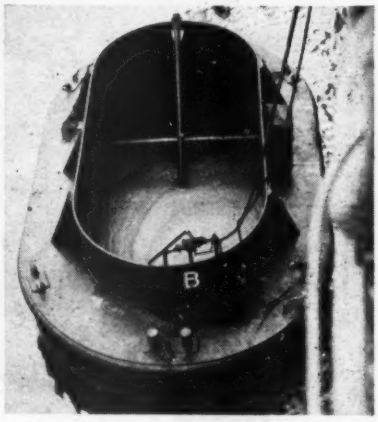
Detailed planning is required on a project of this kind to hold rental charges on expensive marine equipment to a minimum. Dredging can usually be done for about 3 days before the derrick boat and 100-ft. steel barges should be moved on location. From this point on, the remainder of the dredging, as well as the work of raising the line, can be carried on simultaneously. It is advisable to have all necessary equipment moved in with the fleet from home port as conditions are usually unfavorable for transferring equipment and supplies from shore to marine equipment. Material required will consist of a dredge, derrick boat, tug for maneuvering equipment, outboard-motor boat, 100-ft. steel barges to support the line, 30-ft. steel barges for sounding and attaching slings, concrete anchors, caulking barge for welding operations, acetylene welding and cutting outfit, small and large-diameter rope, an adequate supply of good wire line, cable clamps, ½-in. sounding rods, and steel drums for buoys.

Raft for Separating Oil and Ballast Water

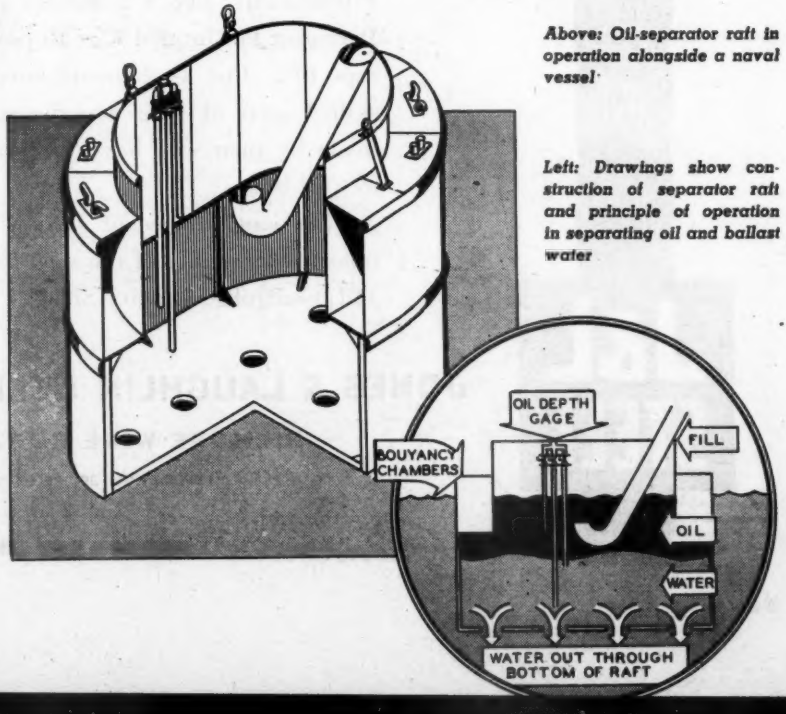
THE problem of separating fuel and lube oils from oil-contaminated ballast water incident to its disposal in the fueling of ships has been overcome by a special raft designed and used by the Navy and now being developed for commercial use. As shown by the drawing, the raft is simple in construction and consists of a steel receiving tank with buoyancy chambers at the top. A three-level hand pump is installed in the tank, and the bottom of the raft is provided with 8-in. holes for the removal of water.

In operation, the oil-contaminated ballast water is pumped into the raft; the oil rises to the top and the water runs out of the holes in the bottom. When accumulated oil is within 1 ft. of the bottom, as determined by the three-level pump, the oil is drawn off by a yard oiler and delivered to reclaiming plants, or the raft is towed directly to the reclaiming plants.

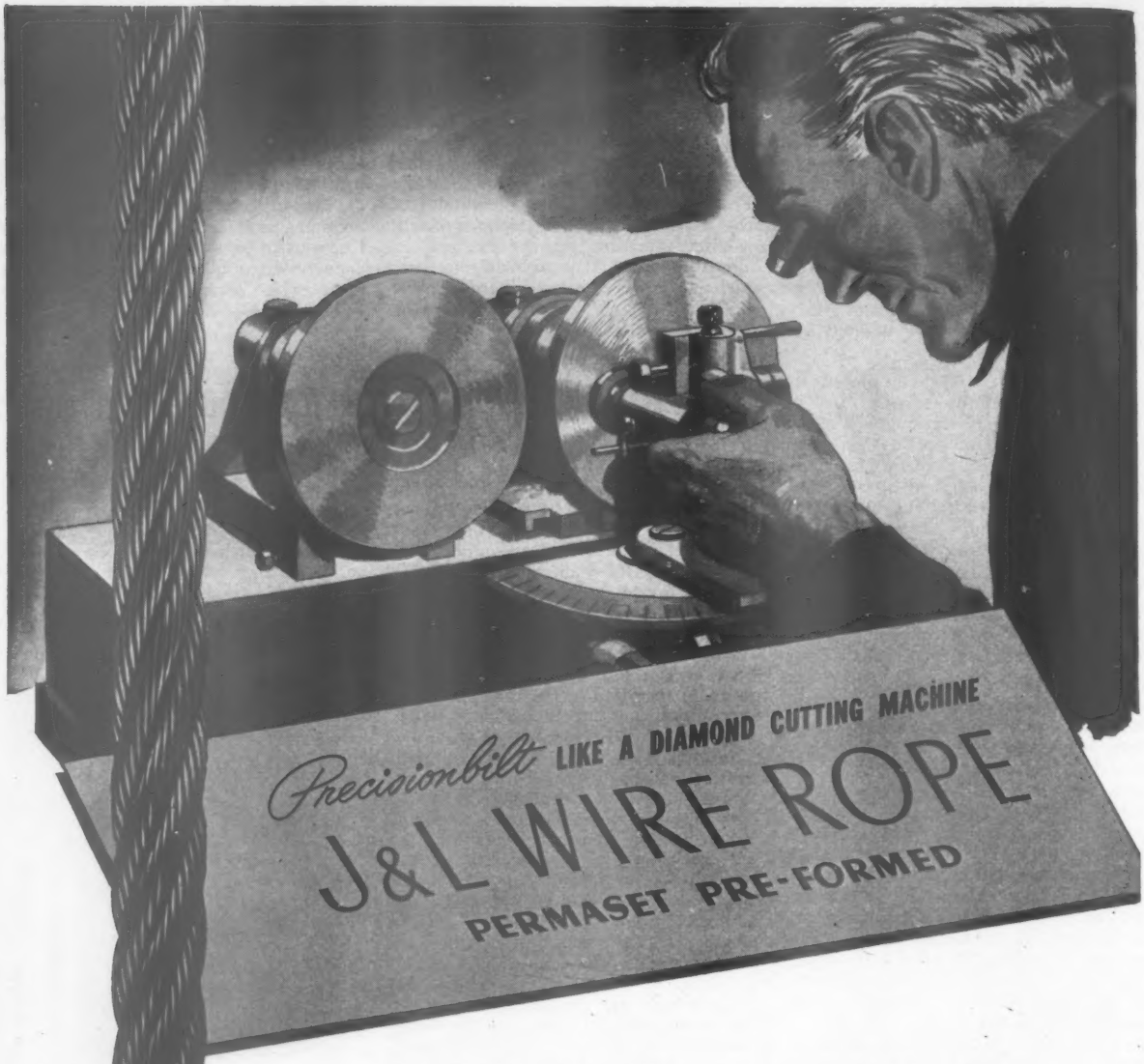
Demurrage on oil tankers is reduced by using the raft in lieu of ballast lines, which are frequently used for the receiving of crude oil as well. Considerable time can be saved since tankers previously anchored off the pier awaiting a berth or the freeing of a ballast line can now dispose of their ballast while at anchor and arrive ready to load. Also, where large ballast water loads are carried, the value of the reclaimed oil constitutes a large monetary saving.



Above: Oil-separator raft in operation alongside a naval vessel



Left: Drawings show construction of separator raft and principle of operation in separating oil and ballast water



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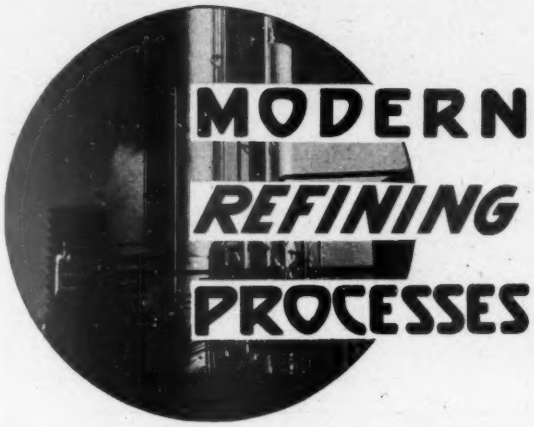
4. The Desalting of Petroleum Oils



by George Armistead, Jr.

SALT in crude causes deposits and problems in two locations in refining units: where water is being evaporated from the crude, causing salt deposits; and where cracking conditions prevail, depositing salt on tube walls, etc., with or without coke. Hydrolysis of salts such as magnesium chloride, releasing HCl, occurs at ordinary distillation temperatures; the HCl must be neutralized to prevent corrosion. Four methods for salt removal are used: water flashing; water washing and settling; water washing and electrical precipitation; and propane deasphalting. Salt left in crude injures the quality of asphalts made therefrom, and also damages catalyst in processes where liquid residual oils are charged directly to catalyst on which salt is precipitated.

THE inorganic salts present in pipeline crude oils delivered to refineries comprise chiefly the chlorides of magnesium, calcium, and sodium either in water solution as finally dispersed brine droplets or as crystals. These dispersed droplets and crystals are in greater or less degree surrounded by protective films of asphaltic, waxy, or other substances which tend to stabilize their condition. They are of varying size, having in a typical instance average diameters around 0.0003 in., although they have been measured down to diameters as low as 0.00001 in. The presence of salt in crude is related to the producing structure and its condition as well as certain producing practices such as acidizing. An informative published study of the physical form of salts present in crude oil is that of Christenson and Horne[1] covering their photomicroscopic investigation of both emulsified brine and crystals found in various crudes.

Problems With Salt

The difficulties occasioned in refinery processing by the presence of salt in crude are well known and have been extensively discussed in the literature[2,3,4,5]. Briefly the problems with salt have been along the following lines:

1. Corrosion, resulting chiefly from hydrolysis of magnesium chloride with the liberation of hydrochloric acid.

2. Plugging of exchangers and furnace coils resulting from the deposition of salt, sometimes associated with coke.

3. The contamination of residual products, such as asphalt.

The prospective need for running greater quantities of crudes having high salt content such as West Texas, as well as the increase of salt content of many other crudes, makes desalting a matter of continuing interest to refiners. In addition, the recent advent of the catalytic-cracking process in which the feeding of residual oils direct to the catalyst is economically attractive, presents the possibility of catalyst contamination by salt contained in such feed. It is of interest to review the present status of methods used for controlling the effects of salt received by refineries in crude oil.

The relative quantities of the three principal chlorides vary within rather wide limits, with the sodium chloride usually predominant, although it is sometimes exceeded by the calcium chloride. Characteristic salt analyses for crudes in which the total present was sufficient to cause refining difficulties are:

Stock—	Total salt— Gms./bbl.	Total salt— Lb./1,000 bbl.	Composition, Gm./bbl.— NaCl	$CaCl_2$	$MgCl_2$
Kansas crude	44	108	30	13	1.5
Kentucky crude	41	92	26	8	7
Michigan crude	10	22	0	8	2
West Texas crude	69	140	35	30	4

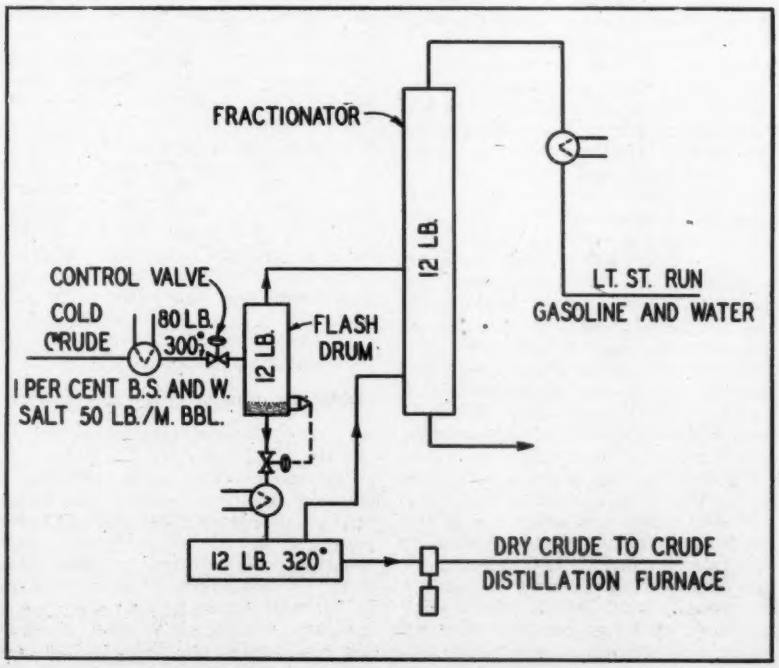


Fig. 4-1—Water flashing from brine-containing crude

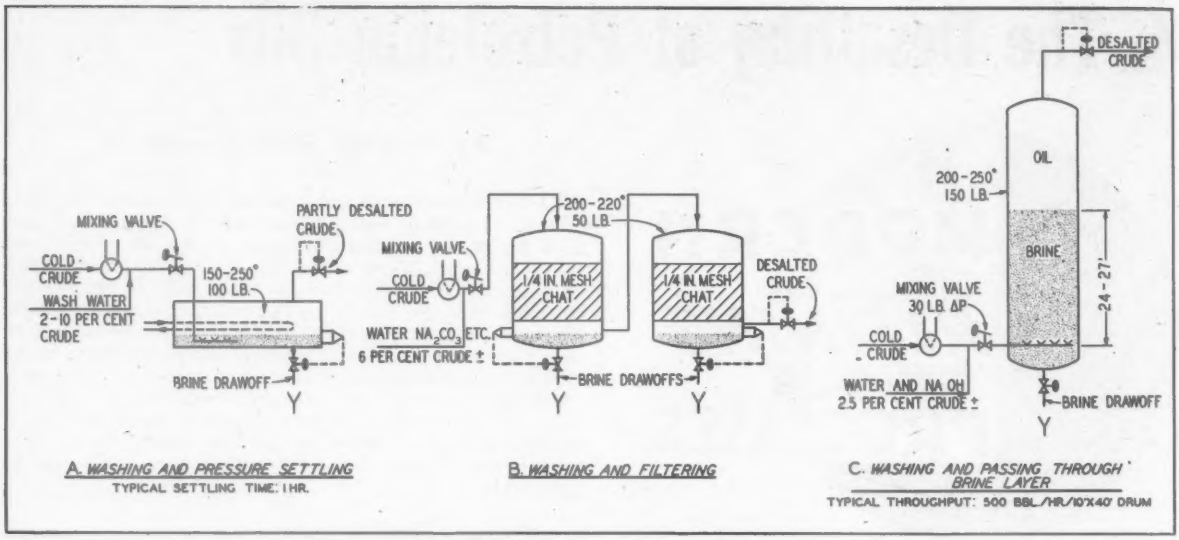


Fig. 4-2—Desalting by water wash and pressure settling—various methods

The hydrolysis of magnesium chloride in the presence of water occurs at temperatures prevailing in ordinary distillation operations, with the liberation of hydrochloric acid the corrosive effect and preventive measures against which are well known. This effect is noticeable at salt contents below those at which the other effects became noticeable. There are indications that the presence of hydrochloric acid is associated also with hydrogen sulfide corrosion where substantial quanties of sulfur are present[4].

Probably the most troublesome aspect of salt content is the plugging of exchangers, heater tubes, fractionating towers, and other equipment which results from its deposition in solid form. This deposition will begin to occur in the equipment as the temperature passes the boiling point of water at the prevailing pressure, evidently resulting from simple evaporation of the water, leaving a considerable portion of the solid salt attached to the surfaces of exchangers or heater tubes. Deposition of solid salts is apparently most inclined to occur in return headers, exchanger heads, and like locations of unusual turbulence and pressure drop which would favor water vaporization. Numerous instances have been noted in heat exchangers where a progressive deposition of salt occurred over a period with resulting increased pressure drop but without reduction in hourly B.t.u. transfer, indicating that deposition was occurring in the heads or in very limited sections of the tube surfaces. Salt deposits of this character can usually be washed out readily with water, for which purpose washing connections and sometimes alternate banks of exchangers are provided.

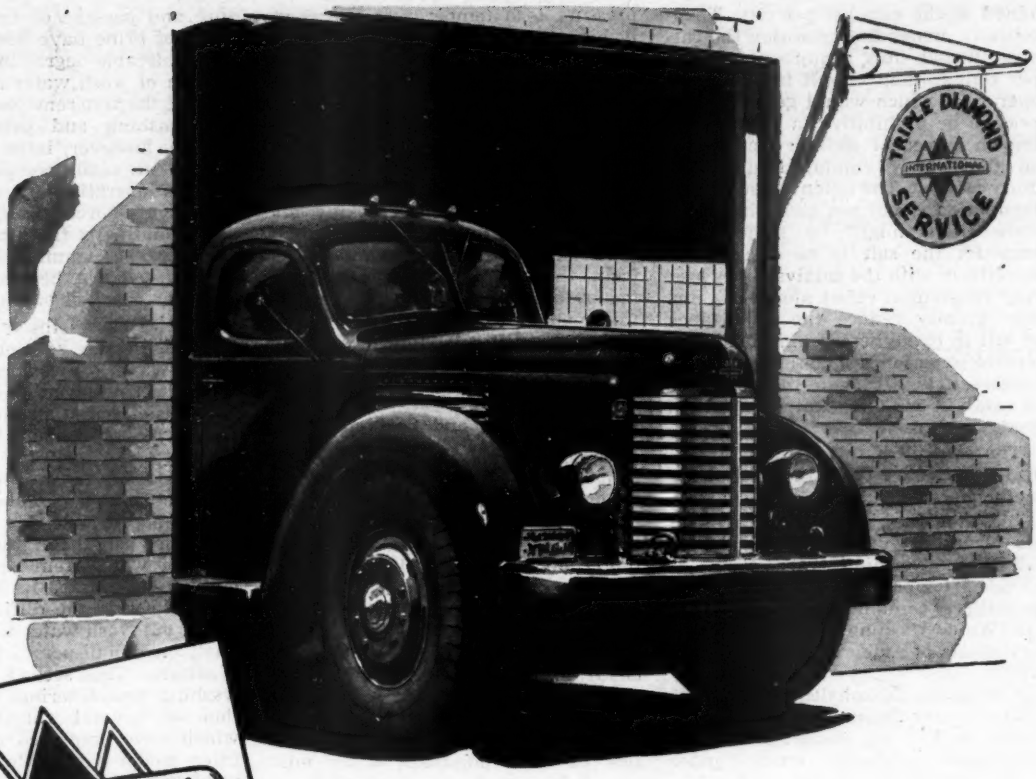
At temperatures above that necessary for complete water vaporization, further deposits do not generally occur until the temperature has become sufficiently high for substantial cracking. For example, coils have been operated over long periods on topped crude containing 150-300 lb./1,000 bbl. of salt between temperatures of 550° and 750° F. with no deposition whatever. The deposition in zones employing temperatures in the cracking range appears to be an entirely different mechanism than under conditions of relatively low temperature when water is vaporizing. The chlorides apparently have a strong tendency to adhere to walls of heating surfaces where the temperatures are above 775°-800° F. and substantial cracking is occurring, and to a lesser extent this occurs in non-heated zones, such as evaporators. For example, a recycle viscosity-breaking coil operating at 850°-875° F. at 300 lb. with salt content up to 50 lb./1,000 bbl. total flow, rapidly accumulated a tube-wall deposition which so obstructed the 3½-in. i.d. tubes as to cause shutdowns in from 8-20 days. The typical tube deposition from this relatively high salt operation was analyzed at 50-60 per cent NaCl equivalent, with most of the remainder carbon.

Determination of Allowable Limits

It is of general interest to define the limits of salt content of feed to crude and cracking units which will cause difficulties of the above-described character. The corrosion resulting from chloride hydrolysis, and the measures required for protection against it are generally proportionate to the salt content, and when neutralization is properly used, it does not interfere materially with the operations. The allowable limits of salt are determined in the main by the concentration at which troublesome deposition will occur in the refinery equipment. In crude-distillation operations troublesome deposition is usually to be expected with salt content above 20 lb./1,000 bbl. when the salt enters the equipment in water solution and the water evaporates in exchangers, furnace coils, and the like, but if the oil is entirely free from water no salt deposition is likely to occur with concentrations as high as 150 lb./1,000 bbl. in tubes, and other turbulent zones. The indications are also that so long as water vaporization from brine particles is prevented no deposition will occur. In thermal cracking coils, concentration of 20 lb./1,000 bbl. or over will give trouble in zones where crack per pass is in the neighborhood of 15 per cent or more of the flowing stream, although in zones with lower amounts of cracking and less severe heating, such as viscosity breakers, the limit may be as high as 40 lb./1,000 bbl. without causing difficulty.

With regard to the effect of salt content on the inorganic ash in residual products, this is important in the preparation of asphalts and road oils which have to meet carbon tetrachloride and carbon disulfide solubility specifications as well as in the preparation of a residual feed for catalytic cracking. For example, one refiner operating on a crude containing 130-225 lb./1,000 bbl. salt found that with the removal of 80 per cent of the salt, CCl_4 and CS_2 solubilities were increased by between 0.2 and 0.4 per cent. A similar effect has been mentioned by Hanson.[3]

In the preparation of residual feed for catalytic cracking, a content of 20 lb./1,000 bbl. of salt represents 300 lb./day to a 15,000-bbl. per day cracking unit, which on the basis of 500 tons of catalyst is 0.03 per cent,



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added to the catalyst per day. Theoretically, under this condition the catalyst would thus acquire about a 1 per cent content of salt in a month's operation, which would generally appear to be prohibitive in view of the known effect of sodium compounds on the widely employed silica-alumina catalyst. The extent of such contamination is not yet clear, however, since there might be some tendency for the salt to be carried out selectively with the catalyst fines loss. Any substantial effect along this line may greatly reduce the importance of salt in catalytic cracking feed. Extensive experience apparently will be necessary to ascertain the tolerance of catalytic cracking units for salt in feed.

The control of salt content is generally effected by the following methods:

1. Water flashing (mainly applicable to crude units).
2. Water washing and settling at elevated temperatures and pressures, sometimes combined with filtration.
3. Water washing and electric precipitation of the emulsified wash water.
4. Propane deasphalting.

The water-flashing method illustrated in Fig. 4-1 comprises heating the brine-containing crude under pressure to a temperature sufficiently high that upon release of pressure all the water will be avaporated and salt left as a suspended solid in the oil. No salt removal is, of course, effected by this method and consequently all of the corrosion effect still remains and the residual stock containing salt will still give deposition if subjected to cracking and will affect the quality of any asphalt, road oil, or the like manufactured from the residuum. If these later factors are of no material importance this method is very useful in eliminating the difficult stoppages caused by salt in crude-distillation equipment.

Washing and Settling

Water washing and pressure settling have been employed extensively with varying results. The main principle involved is the intimate mixture of low-salt wash water with the crude in such a fashion as to dilute the brine droplets and to reach and dissolve suspended crystalline salt. The principal difficulty in this system is that the formation of sufficiently intimate mixture of wash water and oil for effective desalting, results in emulsions which are difficult to break by settling alone. Filtration of the crude-wash water mixture and passage of same through a layer of brine have been effective to a considerable degree in assisting separation of wash water in this system. One of the inherent disadvantages of the washing and pressure settling system, however, is its sensitivity to changes in crude composition for refineries operating on crude from a variety of sources. It is found under such conditions that the removal of salt may be nonuniform, to the extent of varying between 50 and 90 per cent removal of salt.

Fig. 4-2 shows three typical washing and pressure settling installations, one of which (c) washing and passing through brine layer, was described by Gray[8] as effecting a satisfactorily uniform removal of about 85 per cent of the salt down to 10 lb./1,000 bbl. The first of these (a) washing and pressure settling, is simple and usually effects appreciable salt removal, but is mainly useful for preventing large shots of water from getting into the distillation system. Its limitations reside chiefly in the difficulty of separating out wash water which has been finely enough dispersed to effect much desalting. The second method, (b) washing and filtering, is one variation of several filtration methods which have employed a great many filter media such as excelsior, glass wool, hay, sand, gravel, and other materials. The filtration through ¼-in. rock serves to break the emulsion and permits better water washing than could be accomplished with the first-mentioned drum pressure settler. On certain Mid-Continent crudes, this type of operation has consistently removed some 70 per cent of salt, although it is admittedly less efficient on other types. The third type, (c) washing and passing through brine described by Gray,[8] is reported to be consistently effective on West Texas-New Mexico crude mixtures delivered to the refinery at which it is used. The height of the brine layer is reported to be a critical factor in this process, as only 35 per cent salt removal was obtained with 5-ft. brine level compared to 85 per cent with 24-27-ft. brine level, and a brine concentration of 2.5-4.0 lb. NaCl per barrel with 8.0-9.0 pH is also indicated desirable. The theory of the action of settlers of this type was discussed

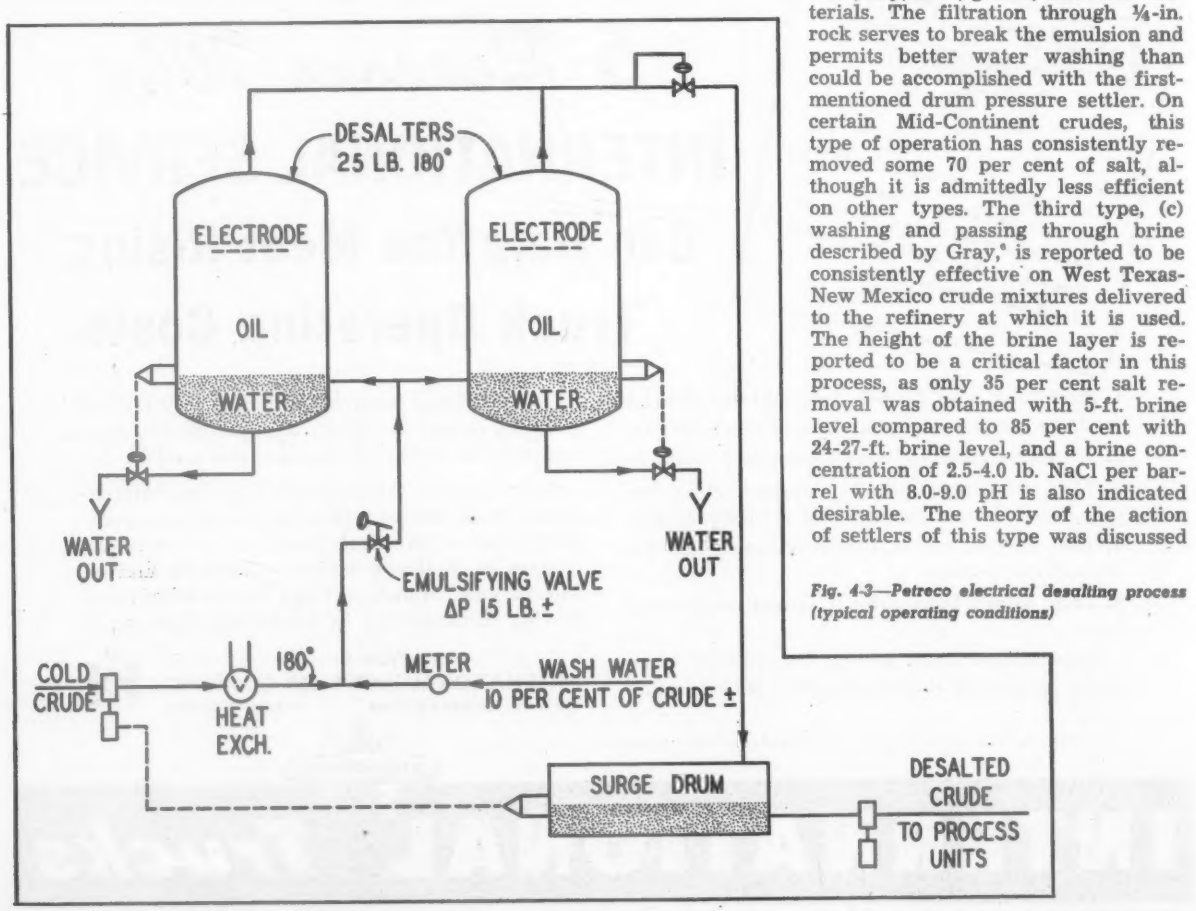

Fig. 4-3—Petreco electrical desalting process (typical operating conditions)

by Dow.[7] It is obvious that both investment and operating cost of the equipment shown in Figs. 4-1 and 4-2 are quite low.

Fig. 4-3 shows the process of water washing followed by electrical precipitation of the emulsified brine as licensed by Petroleum Rectifying Co., which has been extensively described in the literature.[8,9] This process, while requiring a license fee, which includes patent rights, equipment, and technical service, is generally far more reliable over-all than the other water washing methods. This is illustrated by the following table of representative commercial operations on a variety of crudes:

Crudes—	Gravity A.P.I. at 60°	Salt (lb./1,000 bbl.) Unde-salted	Salt (lb./1,000 bbl.) De-salted
East Texas*	38.5	50	4
Oklahoma Cement	35	100	6
Kansas	35	90	6
Central Louisiana	34	110	4
La. Gulf Coast	34 to 39	50	3
Michigan	34	65	3
Illinois	37	90	7
Arkansas Mixture	28	160	10
Ark. Smackover	21	50	5

The amount of wash water employed in the Petreco electrical desalting process depends in part on the required salt removal. Plants are generally designed on the basis of 10-12 per cent wash water, although improvements have recently been made which permit removal in the range of 95-99 per cent to be effected with 2-5 per cent wash water. Units such as shown in Fig. 4-3 handle from 1,500 to 2,500 bbl. of crude per day and are generally installed in as many multiples as is necessary for the total throughput, although some larger single high capacity units have been in use.

Another Desalting Method

Solvent extraction with propane as illustrated in Fig. 4-2 is a different approach to the desalting problem from that which has been discussed in the foregoing. The only installation of this system which has been recently made, was discussed by Cravens and Mylius.[10] It will be noted from Fig. 4-4 that the reduced crude feed to the deasphalting unit is mixed with propane and the heaviest asphaltic material which contains the salt, separated under conditions of elevated temperatures and pressures. The salt-containing asphaltic fractions and the gas oils are subsequently stripped of propane and withdrawn as products and propane is returned to the system. This plant is a modification of the same type of processing employed for lubricating oils. In this service it has important advantages other than salt removal, in that it effects somewhat the same separation of high-boiling and high coke-forming components of the feed as does vacuum distillation, thus providing heavy feed stock for catalytic cracking which requires less coke burning. In addition, the hydrocarbons high in sulfur are concentrated in the heavier fractions and the deasphalting thus improves the sulfur content and lead susceptibility of gasoline made from such deasphalted feed stock by catalytic cracking. These latter advantages, particularly the reduction of carbon in catalytic cracking, are the principal basis for justification of propane deasphalting in this service. This is also a licensed process, involving substantial investment and operating costs compared to the other desalting processes, as well as the important additional advantages.

The trend of salt content in crude is definitely upward and refinery feed stocks are requiring more flexible and positive salt-removal equipment. It appears that this trend will continue in the future. Furthermore, the justification of substantially complete salt removal will apparently increase with the desirability of charging residual feed stocks to catalytic cracking. These factors would seem to favor the use of electrical desalting and propane deasphalting or any other processes of comparable effectiveness which may be developed. The situation in the individual

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refinery will, of course, vary but the trend in this direction would appear to be a positive one.

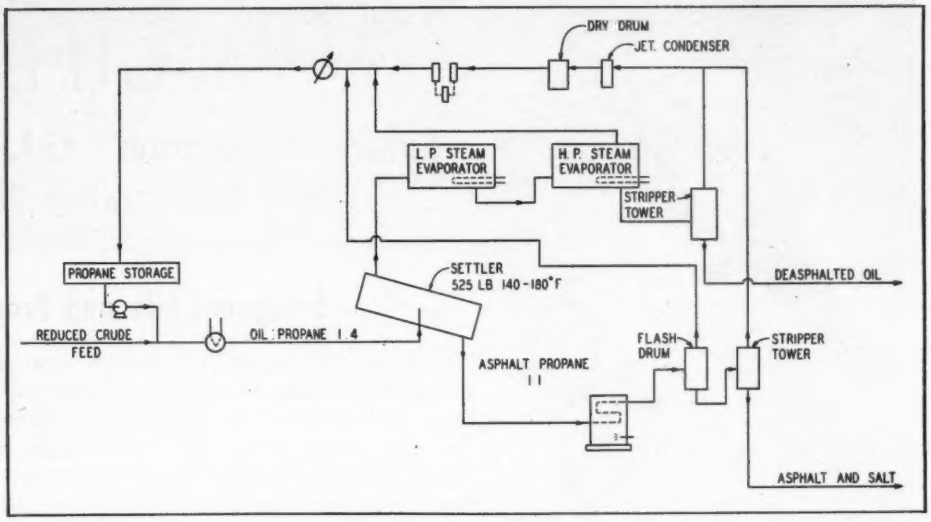

Fig. 4-4—Propane deasphalting system (according to Cravens and Mylius, The Oil and Gas Journal)

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G. E. Lindley has been elected a director and vice president of Richmond Petroleum Co. of California, to be in charge of marine operations. Richmond Petroleum, a subsidiary of Standard Oil Co. of California, is the management company for operations in Colombia and Venezuela.

Dr. Jay V. Beck, assistant professor of biochemistry at the University of Idaho since 1944, has been appointed microbiologist in the production research laboratory of the Pennsylvania Grade Crude Oil Association.

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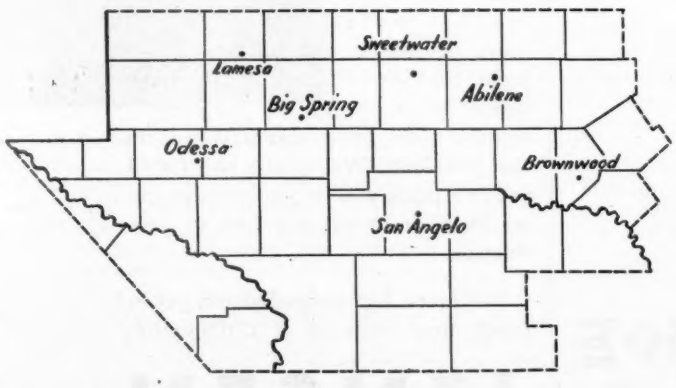

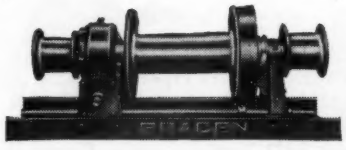

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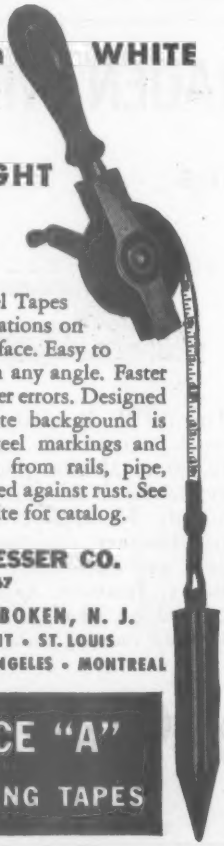

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PROGRESS IN METALS

by W. L. Nelson
Consulting Engineer

Structure of Tungsten-Carbide Alloys

TWO characteristics are mainly responsible for the outstanding abrasion-resistance properties of hard-metal alloys of the tungsten-carbide type with 60 per cent of a low-melting metal. (cobalt). In practice, hard-metal alloys when mechanically stressed undergo elastic deformation only, and the abrasive effect of other metallic materials on hard metal alloys is comparatively low.

The life of hard-metal cutting tools with up to 10 per cent cobalt content is hardly reduced. Addition of more cobalt shows a rapid decrease in life and tungsten-carbide alloys containing more than 10 per cent cobalt suffer permanent deformation when mechanically stressed.

Leaching experiments, by boiling thin sintered plates in hydrochloric acid, show that with a cobalt content of less than 10 per cent a strong network of firmly adhering tungsten-carbide crystals is formed. With 20 per cent cobalt, the alloy breaks down into small pieces.

After removing the cobalt by leaching, the mechanical strength of hard metal alloy samples was determined. It was found that even after leaching, considerable strength is retained in the residual material and is of the same order as that of tungsten-carbides sintered without a matrix metal. It appears that the cobalt plays primarily the part of an intermediate substance aiding the growth of the tungsten-carbide crystals, into an interlocking network.

Apart from the increasing cobalt content, the degree of completeness of the network depends also on other factors, such as grain size of the tungsten-carbide and conditions of manufacture and sintering. A gradual transition from a complete solution in the cobalt matrix is indicated.

Up to about 10 per cent cobalt, the coefficient expansion alters little. After that, it gradually increases with no sudden solution. No influence of porosity on the coefficient of expansion could be observed within the limits of accuracy of the measurements.

Tests proved that the addition of cobalt, by virtue of its properties in aiding the sintering process, reduces the sintering temperature required for optimum bending strength from 1,800° C. for pure WC to 1,300° C. for alloy G2. Above 1,600° C., alloy G2 showed sudden reduction in strength due to increased diffusion and solution processes causing a marked change in the lattice structure of the alloy, which increases in volume. The addition of titanium carbide to the straight tungsten carbide-cobalt alloys raises the temperature required to achieve the greatest strength of the alloy.

The temperature range for satisfactory sintering of multicarbide alloys is considerably more critical than for straight tungsten carbide-cobalt alloys. The sintering temperature of a carbide can be lowered only by metals able to undergo a solution process. Insoluble metals, such as copper, inhibit the sintering process.

A digest of "Structure of Hard Metals" by W. Dawiml and J. Hinuber, Kolloid, Z., Vol. 104, Aug.-Sept. 1943, p. 233 as abstracted in Engineer's Digest (Am.) Vol. 2, Aug. 1945, p. 407.

Degreasing With Solvent Vapor

COMPLETE oil or grease removal from metallic objects is possible only in the vapor phase. When an oily piece of metal is immersed in an organic solvent, the oil is dislodged solely by solvent action. After the piece is withdrawn from the bath, a thin film of oil will remain on the metal surface, due to the subsequent evaporation of the slightly oil-contaminated solvent.

If the work is supported in the controlled vapors of a solvent, such as trichlorethylene, generated from a liquid bath, only pure solvent vapors will impinge on the oily surfaces because the boiling point of the lightest oily fractions of commercial lubricants and greases are well above the boiling point of trichlorethylene. Thus, a continuous oil-free degreasing medium is available.

The cold work surfaces introduced into the solvent vapor column some 100° F. below the temperatures of the vapors makes for easy condensation. The principle of the modern degreasing machine is essentially the same as the original, where a barrel-shaped galvanized iron container was equipped with steam coils in the bottom and entirely submerged in the degreasing solvent. Upon application of heat, a vapor column of solvent was generated, the height of which was governed by a series of water-cooled condenser pipes mounted inside the periphery of the container, several inches below its top edge.

The four most common chlorinated hydrocarbon solvents are carbon tetrachloride, trichlorethylene, perchlorethylene, and ethylene dichloride. The second and third, in stabilized form, are the two outstanding solvents. Consumption of trichlorethylene in degreasing exceeds 100,000,000 lb. annually.

It behooves users of vapor degreasing solvents working with die-casting metals to purchase solvents that have been stabilized against the deleterious effect which might follow from exposure to unoxidized aluminum chips.

The four principal types of degreaser machines are straight vapor machines, vapor-slush types, vapor-spray-vapor type, and immersion type (liquid-vapor). The third type is particularly effective, since the impinging action of solvent liquid from spray nozzles results in complete dislodgement of extraneous deposits by solvent and mechanical action.

In the common degreaser, oil continues to accumulate and a common method of determination of the oil concentration in the bath is by specific-gravity tests. Thus, the average lubricating oil has a specific gravity of 0.9 as against 1.45 for stabilized trichlorethylene. There are tables which show the gravity where oil content ranges from 0 to 100 per cent.

It must be remembered that all organic solvents are toxic, and the usual precautions must be taken from a health standpoint with degreasers.

An abstract of "Vapor Degreasing" by J. M. Payne, Die Casting, Vol. 3, Jan. (p. 67), March (p. 67), and May (p. 73), 1945, taken from the August issue of Metals and Alloys.

Metallurgical Terms

Cast Steel, Casting Strains, and Forged Steel

Steel that is given its final shape by the pouring of molten metal in a mold is called cast steel.

Strains are produced by internal stress due to shrinkage during the solidification and cooling of a casting, and these are referred to as casting strains.

Forged steel is steel in which the final shape has been attained by hammering or hot working of the material by the operation known as forging. Forging is conducted at a temperature which keeps the material in the austenite or solid-solution area of the iron-carbon diagram.

Network Structure

This structure is one in which the grains of one constituent are surrounded by envelopes of another constituent giving a network appearance to an etched test specimen.

Petroleum Engineering Committees: Their Present Activities and Their Potentialities

by D. V. Carter

WITHIN the past several decades those of us engaged in the exploration and operating phase of the oil and gas business have witnessed practically a complete change in what was commonly accepted as the proper operation of oil and gas reservoirs.

What has caused this change of operating concept? The explanation is simple: the application of technology made possible largely by factual data. We have finally come to realize that multiple surface ownership of common oil and gas reservoirs requires constructive and concerted operating action. As more and more operators become awakened to the fact that they are producing from common reservoirs, and that they can work together for their mutual benefit, petroleum engineering committees are being accepted.

D. V. Carter is chief petroleum engineer for Magnolia Petroleum Co., Dallas, and is active in several committees of the American Petroleum Institute. He studied geology, mining, and petroleum engineering at Indiana University, Mellon Institute, and other institutions.

Organization and Functions

The organization of committees is generally undertaken by far-sighted individuals who recognize them as the logical means of providing a basis of common knowledge for cooperative effort at reasonable cost by avoiding repetition. It is as simple as this. It is a solution to the problem which is a fact that we cannot, at least as yet, "build fences" around the recoverable hydrocarbons and reservoir energy belonging to each leasehold.

In order for this to become a reality, the collection of adequate factual data is necessary. Operating problems may require for their solution unitization for effecting operating economies or for the purpose of supplementing reservoir energy by water, gas or air injection. Or possibly a cooperative plan or an operators' meeting to discuss and consider changes in regulatory-body field rules and regulations is all that is needed.

The meaning of factual data is simple. It includes all factors relating to changes as the result of fluid withdrawal from the reservoir, analyses of reservoir fluids, necessary factual geology, and statistics with reference to wells drilled and abandoned. Factual data constitute the primary objective of fact-finding petroleum-engineering committees, whether they be on a field, area, or statewide basis.

History and Growth

The Greater Seminole Area, Oklahoma, development starting in 1926 was the first instance of operators voluntarily employing an umpire to effectuate a degree of ratable take among the producing factions. Again, a similar situation of overproduction occurred in the Yates field, West Texas. This field, discovered in 1926, had developed a potential production of such magnitude 2 years later that it demanded an immediate solution. The operators organized a committee and some of the operators signed an agreement effective October 1, 1927, for the primary purpose of allocating the production of oil between the various leaseholds in this field. The functions of this committee have expanded to include the gathering of factual data and it has become a full-fledged petroleum engineering committee. This Yates Pool Committee, as finally evolved in 1928, developed into the first field cooperative petroleum engineering committee in Texas and the United States.

With the development of the East Texas field in the early thirties, the industry and the Texas Railroad Commission bore the brunt of that problem, and it was solved by several of the state-regulatory authorities with the aid of numerous court tests. In 1933 came the organization of the Conroe Field Engineering Committee, a subcommittee of the Association of Conroe Operators Land and Royalty Owners. In the same year, the East Texas Engineering Association was formed.

The first area engineering committee organized was the Lea County Engineering Committee, an outgrowth of the Hobbs Operators Agreement, dated July 10, 1930. The second area committee was the North Basin Pools

PETROLEUM ENGINEERING COMMITTEES DEVOTED TO COLLECTION AND DISSEMINATION OF FACTUAL DATA

Engineering committee and location—	Date organized	Articles of organization	Paid engineer or chairman
Yates Pool—West Texas	1928	Yes	Chairman
Conroe Field—Texas Gulf Coast	3-11-33	Yes	Chairman
East Texas Pool Engr. Assn.	8-4-33	Yes	Field Engr.
Judkins Pool—West Texas	1934	None	None
Goldsmith Pool—West Texas	1-25-37	Yes	Chief Engr.
North Basin Pools*—West Texas	3-1-39	Yes	Chairman
Fullerton Pool—West Texas	11-15-44	None	None
Carthage Field—East Texas	3-7-45	Yes	Director
La Gloria Field—South Texas	7-19-45	Yes	None
Seeligson Pool—South Texas	12-14-45	Pending	None
Lee County Oprs.—S. E. New Mex.	7-10-30	Yes	Umpire
Cal. Oil Producers' Conserv. Com.	1929	Yes	Manager
W. Edmond Pool—Cen. Oklahoma	5-16-44	Yes	Chairman
Miss. Oil and Gas Engr. Com.	1-12-45	Yes	Director
Holly Ridge Pool—East Louisiana	3-16-45	None	None
Rangely Pool—N. W. Colorado	(†)	None	Chairman

*The North Basin Pools Engineering Committee embraces the following fields: Seminole, Russell, Wasson, Wasson "66," Wasson "72," Waples-Platter, Owenby, Dean, Slaughter and Levelland. †Information not available. (The Engineering Subcommittee of the Lance Creek Field, Wyoming, omitted because majority of the field is unitized.)

Engineering Committee, organized in March 1939. The North Basin Committee includes many of the larger pools of the West Texas Permian Basin.

The oil industry in the state of California has a rather unusual situation. It is the only major oil-producing state without proration laws. A voluntary restriction of oil and gas withdrawal rates is engaged in under a state "conservation" program. The statewide organization known as the "Conservation Committee of California Oil Producers" together with its predecessor organizations has been performing continuously since the fall of 1929. This is the first statewide cooperative engineering committee in the United States.

The recurrence of development activity in Arkansas in early 1937 witnessed the formation of a statewide cooperative engineering plan. The operators organized the "Arkansas Operators Committee" which was administered by the State Board of Conservation. This was the second statewide-cooperative committee. The committee functioned until the passage of appropriate state legislation on February 20, 1939, which created the present Arkansas Oil and Gas Commission, effective April 1, 1939.

The third statewide engineering committee is the Mississippi Oil and Gas Engineering Committee, organized January 12, 1945. This committee is the first statewide organization whose sole purpose is the collection and dissemination of factual data.

To show the importance and extent to which these committees have grown: I estimate that at the beginning of 1945, for the states in which such committees operate, namely Texas, California, Oklahoma, Louisiana, New Mexico, and Mississippi, 48 per cent of the crude-oil and condensate reserves in these states shows evidence of the application of scientific producing methods. I also estimate 43 per cent of oil and condensate reserves of the United States shows effects of petroleum engineering.

Group Efforts Specialized

A number of modified forms of engineering committees have come into being from time to time to serve various purposes. Special study groups have been appointed in many fields to investigate particular problems; in some cases consulting engineers are employed. At the present time special engineering-study committees are working in the Vacuum and Lovington fields of Southeast New Mexico, and the Fullerton, Slaughter, and Seminole fields of West Texas. Cooperative investigations are also under way in the Piedre Lumbre, Heyser, and Seeligson fields of South Texas and in the Elk Basin field of Wyoming.

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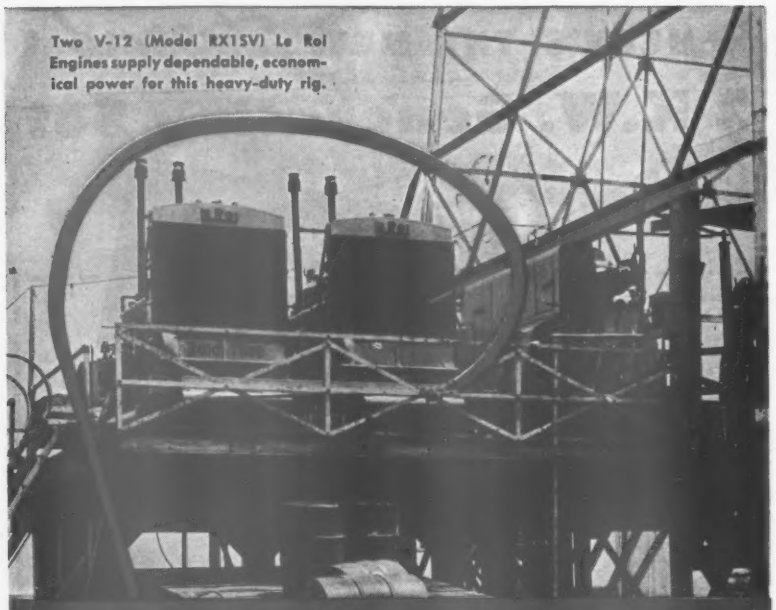

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Another cooperative instrumentality that is used is the repressuring agreement. Here the operators band together to re-energize the field although oil production operations are conducted on the usual freely competitive basis. The K.M.A. Pressure Maintenance Association and the West Pampa Repressuring Association characterize this style of organization. The step beyond this, of course, is full unitization in which the entire property operation is managed by an association such as the Haynesville-Pettit and Cotton Valley Units in Northern Louisiana and Southern Arkansas.

Perhaps the simplest type of engineering committee for gathering factual data is one where the operators have agreed to exchange information, but do not go through the formality of signing articles of organization or employing an engineer to conduct the affairs of the committee. The Judkins Pool Engineering Committee in West Texas is such a group. An annual report of factual data is distributed to the member operators.

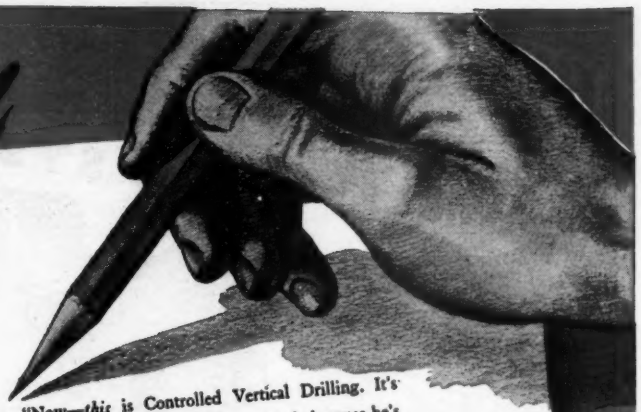
A committee may formally adopt articles of organization, but not employ a full-time engineer-chairman or director. In this case the chairmanship is voted to a member of the committee who does not receive any extra compensation from the organization. The Fullerton Engineering Committee and the La Gloria Engineering Committee follow such a pattern.

Uniformity and Coordination Achieved at Low Cost

The principle of mass production seems to be an integral part of our modern day life, and, of course, there is no reason why it will not work in obtaining engineering information; in fact it can be applied. Management is constantly faced with the problem of operating costs. In this regard the member operators welcomed the opportunity to participate in the Mississippi Engineering Committee activities as a means of reducing operating expenses by utilizing the service offered by the committee. It relieves the necessity of company engineers and other employes duplicating the efforts of others. Of greater importance, it permits the engineer to "engineer" instead of collecting data. The general system of individual company data collecting can never be considered as efficient, as it is often impossible to get a composite picture reliable yardsticks of the fields. Hence, the old wolf cry of "increased operating cost" when applied to committee membership is unfounded and based on ignorance of the facts.

Why is it necessary to collect factual data early in the life of each reservoir? Because a reservoir is a dynamic thing; it is constantly changing as fluids are withdrawn. Consequently, data must be obtained peri-

"Maybe this will help explain CONTROLLED VERTICAL DRILLING"*



"So they said down at the office that I know something about drilling vertical wells, eh? Well, I ought to . . . I've drilled a lot of 'em.

"First off, let's get it straight what Controlled Vertical Drilling is *not*. It's *not* this. Even if a hole like this bottoms dead center under the rotary, it's *not* a "controlled vertical" well. It never has been, and never will be anything but trouble. Trouble drilling, with extra bits, maybe twist-offs, keyseating, washouts, fishing jobs. Trouble running casing and cementing. And trouble every year it is on production.

"Then there's this — Controlled Directional Drilling, where you're trying to hit a spot some distance from the derrick . . . out under water, say. Reason I mention it is, a lot of men get confused. They think Controlled Directional Drilling and Controlled Vertical Drilling are the same thing used two different ways. That's wrong. They're two entirely different methods. And the methods and equipment used in one won't work in the other—just remember that!

"Now—*this* is Controlled Vertical Drilling. It's where the driller makes plenty of hole because he's always using the correct weight and speed—*straight* hole because he never lets it get beyond the critical angle. Critical angle? That's the angle at which the forces which cause hole deflection really become established. It varies with the size of the hole, drill collar, and so on, but it's always small. Some men figure it something less than 2 degrees: me, I'd like to keep the angle of the hole less than 1 degree. Any deviation less than that is easy to correct, but you can buy yourself a lot of grief if hole deflection gets beyond that angle.

"How do you know what the hole's doing? A smart question, because that's the heart of Controlled Vertical Drilling. The driller's *got* to know what's happening every foot of the way. And the only way to know is to take frequent readings with an inclination recorder that's accurate down to small fractions of one degree. I use a Totco Recorder myself—been using it for years—because it *is* accurate to less than an eighth of a degree, because I can *always* depend on its readings, because it's simple to use, and can be dropped down the drill pipe, run on measuring or sand line, or with retractable coring equipment.

"That's the whole basis of Controlled Vertical Drilling . . . take frequent readings with a reliable recorder; never let hole deflections get beyond the critical angle; use the information the recorder supplies as a guide for correct weight and speed to cut each formation efficiently. That's the way to drill *better* wells, drill 'em faster, drill 'em cheaper."

*Based upon the actual statements of hundreds of drillers and drilling superintendents in all parts of the country, and in many foreign fields.

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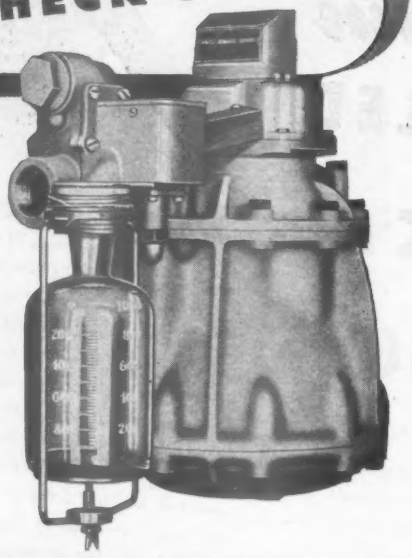

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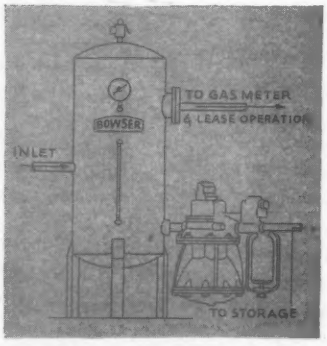

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odically and analyzed in order to accurately predict future behavior, and, if need be, change the mode of operation. Often, small special engineering or geological committees are appointed by field operators for the purpose of making an intense, single objective report on the feasibility of unitization or the installation of a water-flood or gas-injection project for increasing the ultimate recovery and production rate of a field. Or perhaps the study will provide the basis of fieldwide long-term gas sale contracts or the building of a plant for utilizing and processing gas for liquid products. In any regard, it is quite obvious that a factual-data history of the field minimizes assumptions and is the only foundation upon which miscellaneous information can be coordinated and a sound study based. If such data are not available a substitute is frequently invented. In fact, large expenditures are often made upon recommendations based on nothing more substantial than a vivid imagination.

Uniformity and coordinated effort are essential in acquiring reservoir data. A momentary consideration will make this quite apparent. Considering the constantly changing conditions in a reservoir as fluids are withdrawn, it seems very illogical to assume that data such as reservoir pressures, taken in only one section of a reservoir, can be coordinated and used with data taken some time later in another section of the same reservoir. Yet, this is exactly what is being done in many fields where operators have agreed to exchange information, but do not coordinate their efforts.

Data Needed in Allocating Production

The method of allocating oil and gas production used in the various states has not kept up with the advances made in the engineering field in determining the amount of oil and gas in place. Too much emphasis has heretofore been given in the allocation formula to surface acres and to per well allowables and too little emphasis has been given to reserves.

There has been a perceptible trend in recent court decisions toward the establishment of allowables based in large part upon oil in place. This means that factual data gathered by engineering committees will play a much larger part in the councils of the regulatory bodies.

A word should be said about the legality of engineering committees. As a general rule it may safely be said that cooperative activities of operators in the same pool, effected through an engineering committee, solely confined to field work for the purpose of securing data and information, its accumulation and dissemination, cannot be considered as cooperative activities forbidden by our laws.

The contracts under which the engineering committees mentioned herein carry on their activities have been found to be under their terms well within the law. However, members will not be protected simply because they have reduced their purposes to writing if, as a matter of fact, in their meetings, discussions, and activities they make use of their association to violate the law. Decisions have been cited which condemn discussions concerning price and activities generally restricting production for the purpose of limiting competition.

These two articles on cooperative field engineering work are taken from the presentation given at a joint meeting of the Illinois Society of Petroleum Engineers and the Illinois Basin Chapter of the American Petroleum Institute held March 1, 1946, at Mount Vernon, Ill.

Operation and Cost of an Engineering Cooperative

by Alec M. Crowell

NORMAL cost to operator-members for operation of the Mississippi Oil and Gas Engineering Committee is approximately 2 mills per barrel of oil and condensate produced. The average cost per well is $4.75 per month or 15 cents per well per day.

The Mississippi Committee has been in operation only 13 months; however, expenses for the first 12 months of operation are normal for such groups. A very interesting fact is presented on the small accompanying chart. The assessed production of the member operators increased approximately 10 per cent over the calendar year 1945 while the operating cost was reduced by more than half—from 4.92 mills per barrel in February to 2.01 mills in December.

Objectives and Results of the Mississippi Group

From the beginning it became apparent to the member-operators that by utilizing the services offered by the committee the burden on their technical staffs could be lightened with resulting economies. The information placed in the reports, although information still regarded as private by some, is requisite data for dependable analyses of field behavior and has led to a better understanding not only among operators but also between the State of Mississippi and the oil and gas operator. Further, Mississippi is moving rapidly forward into the realm of good conservation practices and each step has been made through the facilities of the engineering committee.

Alec M. Crowell is director of the Mississippi Oil and Gas Engineering Committee and previously had organized and supervised similar work in the state of Arkansas. Between 1933 and 1938 he was director of field engineering and research for the Texas Railroad Commission; other oil-industry work has been in the Mid-Continent and California areas.

Types of Information That Are Collected

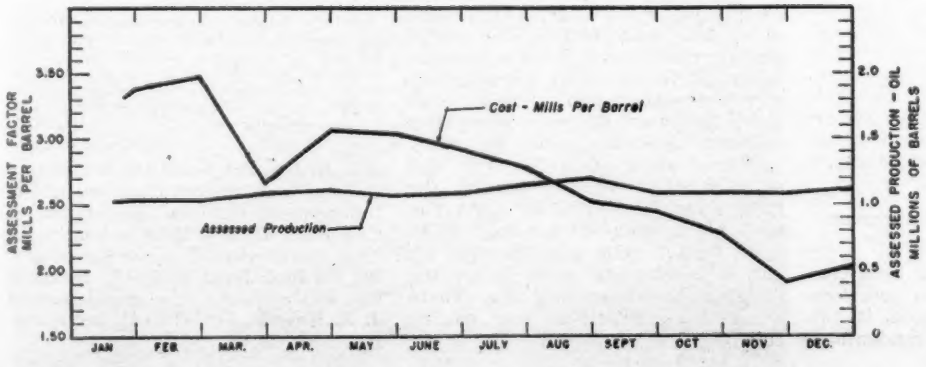
The broad program outlined by the policy group contemplated information that can be divided into five general groups:

1. Reasonably accurate data on gas, oil, condensate, and water production for each reservoir and each lease within each reservoir.
2. Subsurface pressure surveys for correlation with production data.
3. Productivity indices on a reasonable number of wells in each reservoir.
4. Analyses of subsurface samples of the reservoir fluids of each reservoir.
5. Geological aspects and structural data on each reservoir.

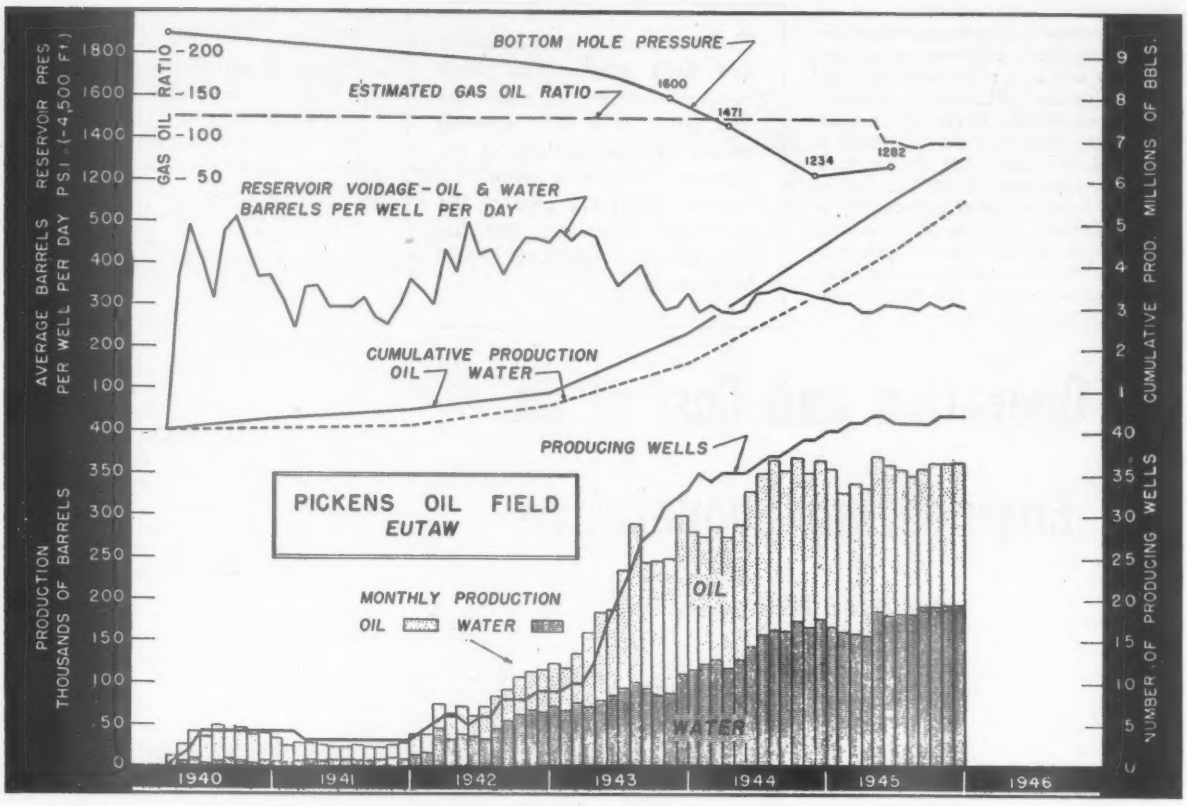
The information is essential to reservoir studies and has been gathered. The reports of the committee make the data continuous and current and the cost of gathering the information is insignificant in comparison with benefits stemming therefrom.

The data collected for each oil and gas reservoir in the State of Mississippi are illustrated by the accompanying reservoir-behavior chart for the Pickens field. Other basic reservoir data obtained include field location, type of structure, name of the producing formation, ownership and discovery date of the discovery well, and current spacing pattern for the field. There are also set out the average elevation of the wells in the field, original water level, current water level, top of effective porosity, total effective section, bottom-hole temperature, average porosity, and permeability. Further, the values are given for connate water, formation volume factor, an estimated recovery factor, gravity of oil and gas, gallons per thousand cubic feet of gas, original and current operating gas-oil ratio, and the original and current reservoir pressure at a fixed datum plane.

Individual ledgers for each field on the production of oil, condensate, gas and water are kept in the offices of the committee for the use of its



In first year of operation, costs of the Mississippi Oil and Gas Engineering Committee ranged from 4.92 to 2.01 mills per barrel. This covers 88 per cent of the state's production and 75 per cent of the oil and gas wells



One of the reservoir behavior charts maintained by the Mississippi Committee

members. These production ledgers are subdivided, a section being devoted to the individual well and the individual lease in each reservoir. At the end of each month, from the data contained in these ledgers, is calculated the reservoir voidage represented by the production of oil, gas, and water from each reservoir. Results of this calculation, expressed as reservoir voidage in barrels per well per day, are posted on a reservoir-performance chart.

Of all the data collected by the Mississippi committee the most difficult has been the collection of reasonably accurate information on the production of water. This for the reason that water, unlike oil and gas, has no intrinsic value. There is no incentive to measure oil-field water except in particular cases. Over the past year the engineers of the committee have worked with the switchers and pumpers in the field, particularly those employed by the small operator. The engineers have shown these field men the use to which the information is put, a procedure which has proved of much value.

Laboratory and Field Equipment in Use

Cooperation between the field employes of most oil and gas operators and the committee engineers is excellent. A record of oil, condensate, gas, and water production — beginning with its inception—on every oil and gas well in Mississippi is now the property of the committee.

The facilities of the Mississippi cooperative are now complete. Equipment needed for the gaging of reservoir pressures, the measurement of natural gas and water, and a field laboratory for the calibration of these instruments are in operation. The office equipment includes, among other things, a drafting room, calculator, adding machine, and an especially designed bookkeeping and accounting system set up by a certified public accountant.

Scope of Field Conditions in Mississippi

Although oil was discovered in Mississippi only 6 years ago, a wide range of oil and sand conditions is represented by the 23 reservoirs now under study. There are many variations in recovery mechanisms, extending from fields produced by wide open flow to fields operating under voluntary restricted rates of withdrawal. Oil and condensate gravity among the fields range from 14° to 68° A.P.I. The well-spacing patterns are fixed at 40 acres for oil wells and 320 acres for gas or condensate wells under the state's statewide spacing rule. There are few exceptions to this spacing rule.

BOOKS

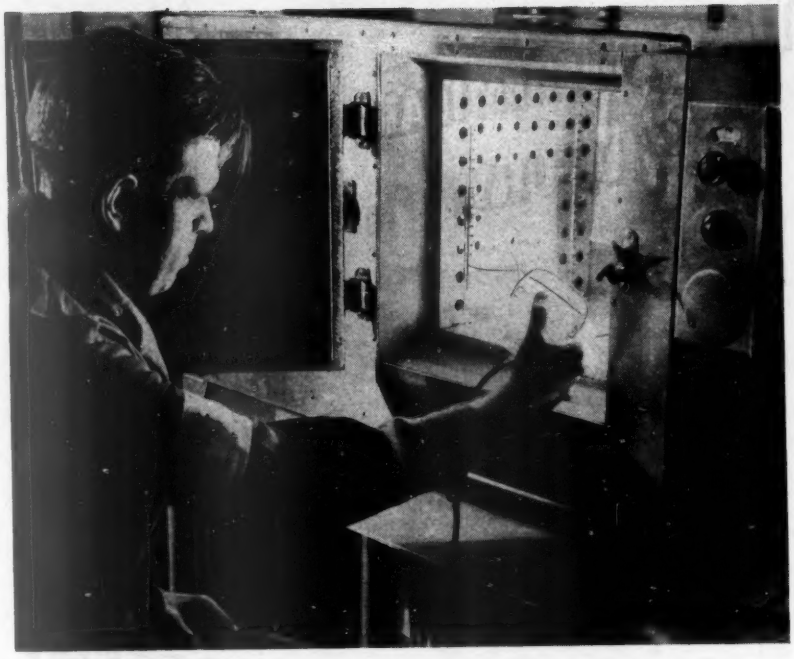
METALS AND ALLOYS DICTIONARY. By M. Merlub-Sobel. Chemical Publishing Co., Inc., Brooklyn. 238 pp. $4.50.

This uptodate reference work contains definitions of metallurgical terms, composition, properties, and uses of important commercial alloys. It gives the physical constants and properties of chemical elements, description of machinery and processes used in modern metallurgy, and other pertinent information. It is designed for the use of all those who want to know about the applications and peculiarities of metals, alloys, and raw materials used in metallurgy.

MIDWEST OIL REGISTER. Charles G. Delfield, publisher. Box 892 Tulsa. $56.

This set of new directories is divided into seven handy pocket-size volumes, plastic ring bound, each covering a certain oil-producing region. Thus one volume is devoted to California, others to the Rocky Mountain region; Kansas; Louisiana, Mississippi, and Arkansas; Texas; Kentucky, Indiana, and Illinois; and Oklahoma. The publisher has attempted to contact all known companies and individuals engaged in the drilling and producing divisions of the oil industry.

C. A. Johnson, Socal Oil & Refining Co., has been elected president of the Independent Refiners' Association of California. **D. B. O'Neill** was named a vice president and general manager. **W. W. McCallen,** McCallen Refining Co., was elected a vice president, and **J. A. Novelli,** Elm Oil Co., secretary-treasurer.



Laboratory-oven measurement of oxidation susceptibility

Lubricating-Oil Research in Socony-Vacuum Laboratories

by Fabian R. Staley

Most of the methods of measuring color involve the human eye, but the human eye is often incapable of good precision and varies. In this colorimeter the human equation has been eliminated, hence it yields greater precision than is possible by visual methods of color measurement

THE general laboratories of Socony-Vacuum Oil Co., Inc., operate as two separate, coordinated groups. The research and development laboratories are located at Paulsboro, N. J., and the technical service laboratories are located at Brooklyn. The local laboratories of Magnolia Petroleum Co. and General Petroleum Co. and various refinery laboratories work closely with these. Long-range projects are generally carried on at Paulsboro. The new refining techniques developed by the laboratories through constant research have enabled the company to manufacture superior lubricants. Solvent-refining research on lubricating oils has been conducted in the Clearosol process pilot plant at Paulsboro. A new pilot plant for lubricating-oil refining is included in the plans for extensive expansion of the research and development laboratories which will be ready for use this spring.

Addition Agents

During the past 10 years, thousands of addition agents have been synthesized by the many organic chemists working at the laboratories. Many important "firsts" have been developed here, including pour-point depressants, oiliness agents, oxidation inhibitors, and extreme-pressure agents. Very efficient detergents for motor and aircraft oils have been developed recently.

Addition agents are used to obtain specific properties and are special compounds. Oxidation and corrosion inhibitors include many types of organic and organo-metallic compounds, among them hydroxy compounds, phenolic derivatives, nitrogen, and sulfur compounds. Corrosion inhibitors include compounds containing chromium, mercury, bismuth, tin, and other metals. During the war, when the supply of tin was low in this country, additives containing barium were developed. A chlorinated petroleum wax reacted with an aromatic and then combined with a barium salt is an example of a detergent used in motor oils.

All-Purpose Automotive Oils

A definite trend toward all-purpose automotive oils was emphasized through military necessity. An oil, containing both oxidation inhibitors and detergents, was developed by the laboratories during the war to meet the U. S. Army requirements for a single oil satisfactory for all ground vehicles.

Modern Motor Oils

The new motor oils developed by these laboratories, in addition to possessing improved lubricating properties, show ability to reduce carbonaceous deposits on pistons, rings, valves, and bearings; also they greatly reduce corrosion and foaming. Tests in diesel and gasoline engines in city bus service, using the new re-

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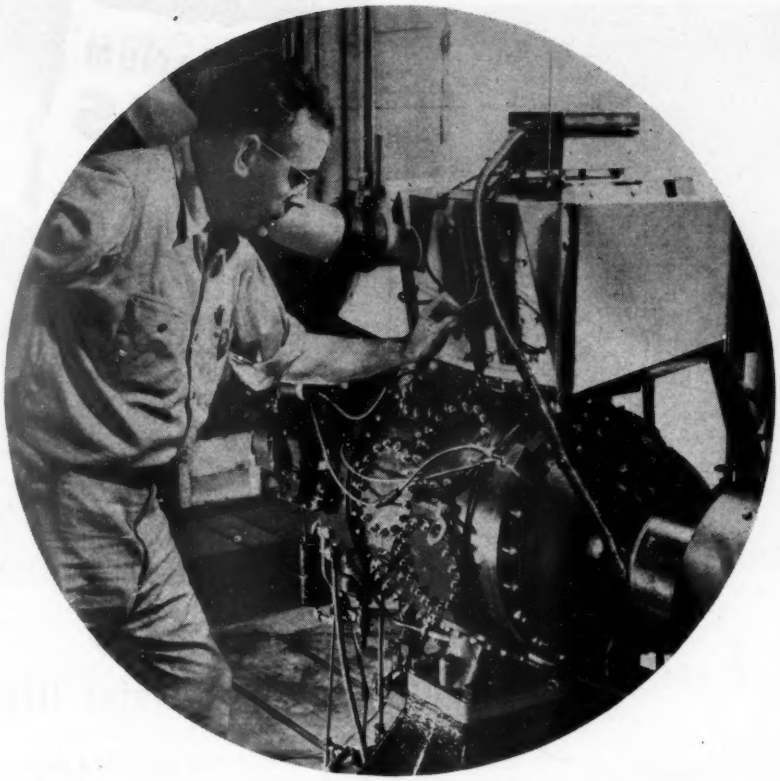


the engine-test laboratories have been steadily expanded until now they are among the best equipped in the world.

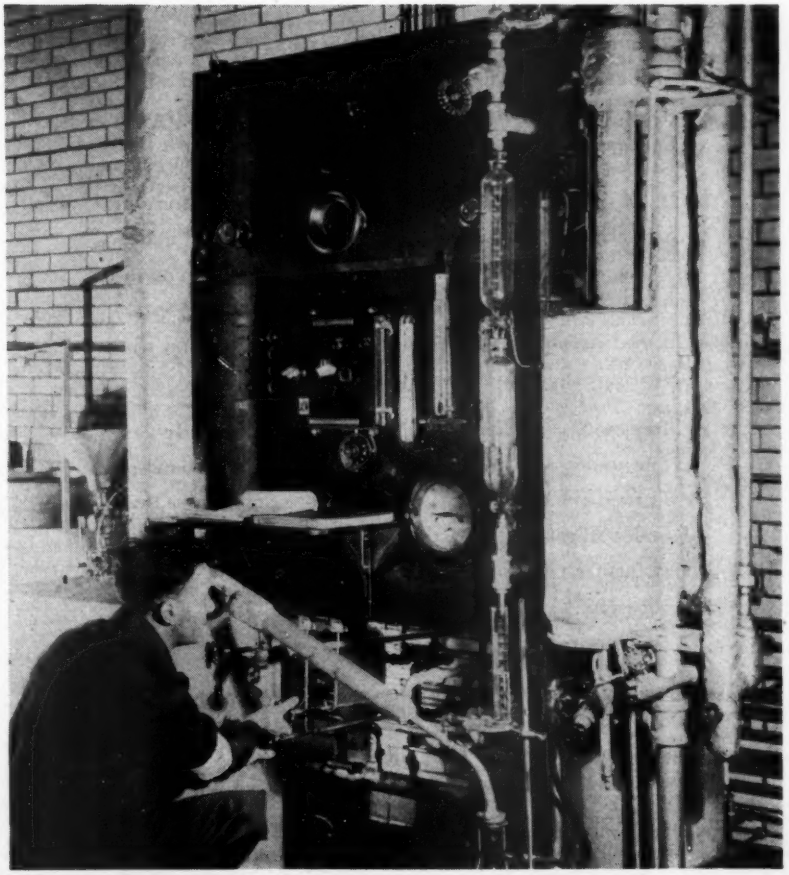
Circulating-Oil Laboratory

A unique circulating-oil laboratory is used to study lubricating-oil problems where experimental oils are subjected to continuous testing under conditions that are identical with those in industry. Here, on carefully controlled circulating units, lubricating problems that arise with reduced clearances, increased loads, and higher operating temperatures are studied.

The motor laboratories include a complete section for aircraft engines. Engines from leading manufacturers are brought in for continuous testing under controlled conditions. New additive-type oils keep engines cleaner and extend periods between overhauls.

Left: Recent progress in motor-oil research points unmistakably to even greater developments coming in the near future. Undoubtedly, the new oils for both autos and aircraft will be reinforced with powerful oxidation inhibitors and detergents. Shown here is an aircraft engine of the type used on heavy U. S. bombers

Right: The accuracy of the true boiling point still is even greater than the accuracy of the full-scale refinery equipment. Through the use of this tool the laboratory can predict for the refineries the type of products and the quantities which they can obtain from any crude oil, and it can check the efficiency of refinery operations. During the past few years, crudes from all over the world have been evaluated in this still

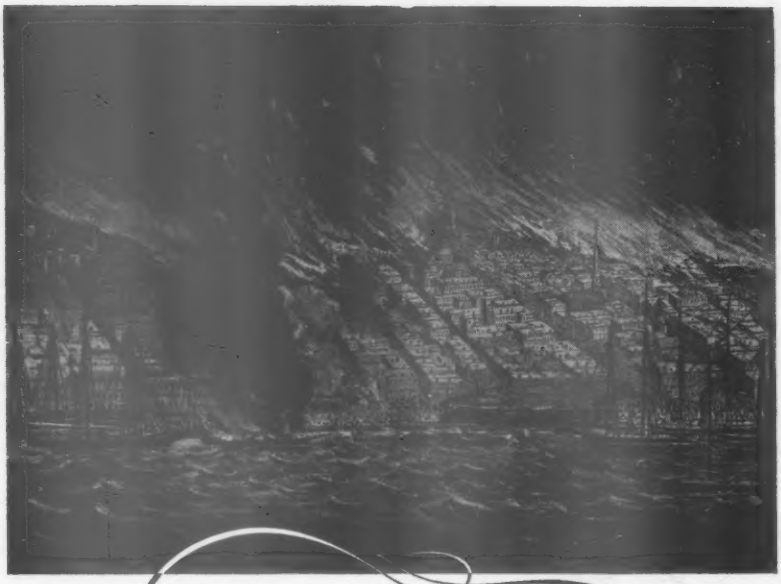


inforced oils, show cleaner engines and ring life ranging from 75,000 to 100,000 miles, while bearing life was extended from 20,000 to more than 75,000 miles.

Research and development on steam-turbine oils is carried on continuously in the laboratories. Early in the war sludging and rusting of steam turbines in naval vessels presented difficult problems. Development work on improved rust-inhibited turbine oils was started, and after extensive tests aboard ship, a new oil was produced that was accepted and approved by the Navy.

Engine Tests

The general laboratories have installed more than 100 automotive and aircraft engines for evaluating oils, ranging in size from very small, single cylinders to giants that develop over 150 hp. per cylinder. Usually half the test engines are running day and night. In recognition of the fact that actual performance in internal-combustion engines is the only conclusive test for fuels and lubricants,



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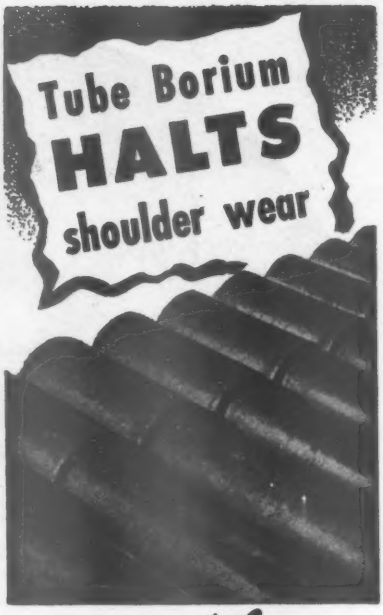

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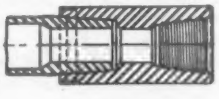

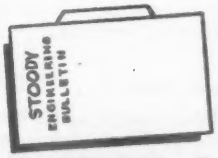

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Compressibility of Liquid Hydrocarbons

by E. W. Jacobson, E. E. Ambrosius, J. W. Dashiell, and C. L. Crawford

Oil is measured or metered in units of volume, and, of course, the compressibility is one factor that affects volume. This article presents graphical alignments of the A.P.I. gravity against compressibility for a list of 19 pure hydrocarbons and oils. E. E. Ambrosius is in the department of mechanical engineering, Pennsylvania State College; the other authors are with Gulf Research Development Co.

THIS report presents the results of the continued study of the available data on the subject carried on during the past 2 years since the first report was presented to the American Petroleum Institute topical committee on pipe-line technology at Chicago, November 8, 1943, as a part of the work of the committee for joint A.S.M.E.-A.P.I. volumeter research. At that meeting the committee for volumeter research was directed to prepare a code of recommended practice for positive displacement meters in hydrocarbon service. It was therefore essential that intensive study of all available compressibility data be made with the object in view of presenting this data in a readily usable form in the code. A simple presentation of this data was worked out and appears as a part of the code of recommended meter practice.

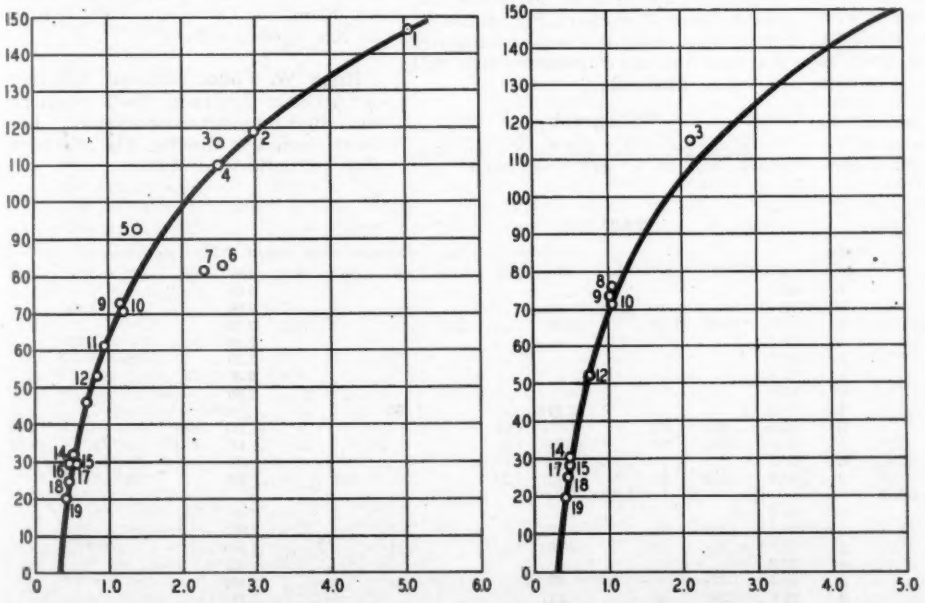
It was apparent early in the study that, if a convenient and readily usable presentation of compressibility data were to be made in the face of limited original test data, some sacrifice of exactness must be made to secure simplicity. Some readily determinable physical property of hydrocarbons must be selected for correlation with the compressibility properties. The identifying conditions required are temperature, pressure, and some property to indicate the particular hydrocarbon. The first two conditions (temperature and pressure) offer no obstacles, but the third condition is difficult to supply in convenient form since no one physical property of a hydrocarbon seems to have a direct correlation with its compressibility.

The compressibility of a hydrocarbon is a function of temperature and pressure, but neither of these relations is linear. The investigation by R. S. Jessup indicates a correlation between the viscosity and the compressibility of hydrocarbons, but the viscosity is not a conveniently measured property. Also the greater part of this investigation by Jessup was in the range covered by lubricating oils where the change in compressibility due to temperature and pressure is comparatively small and this correlation may not hold for lighter products such as the gasolines.

Another correlation, by K. M. Watson, has been developed based on the theory that all fluids should obey a universal equation of state when the pressure, volume, and temperature are expressed in "reduced units," i.e., ratios to the critical values. This seems to be the only logical correlation proposed. The disadvantage, however, is that the critical pressure and temperature of the various petroleum products is not usually known and would be difficult to determine. To overcome this objection, use is made of pseudocritical values estimated by the use of the Engler distillation curve for the product. This distillation curve is not always known and is not conveniently determined in the field, and the use of estimated critical values based upon this distillation curve are a possible source of error. Possibly the greatest objections to this correlation are that the curves available are such that it is difficult to interpolate closely in the range necessary in metering practice and that the process involves about 14 operations in order to arrive at a value for the compressibility factor.

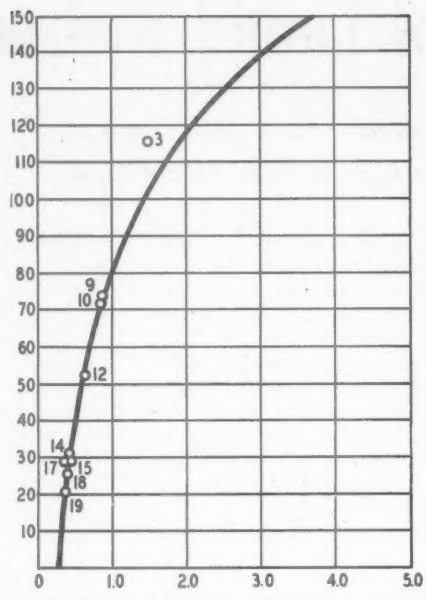
Since the A.P.I. gravity is an easily determinable physical property of petroleum and there was in use by one major oil company a compressibility chart based on A.P.I. gravity, it was decided to attempt to develop a chart based on A.P.I. gravity, temperature, and pressure, even though there was no theoretical basis for such a correlation. After some study, it was apparent that such a chart could be developed that would fit rather closely a great majority of the available data. This chart presents only the mean compressibility from 0 to 1,000 psig. pressure and does not attempt to show the relation between compressibility and pressure.

The process of correlation consisted of plotting values of A.P.I. gravity against compressibility for various temperatures. Figs. 1, 2



Figs. 1 and 2—In the above, A.P.I. gravities as ordinates are plotted to correspond with their related compressibility factors from Table 1. (Data at 100°, 80°, and 30° F.)

and 3 were plotted for temperatures of 100°, 80° and 30° F. from data listed in Table 1. Where the experimental temperature was at variance with the plotted temperature the data were adjusted to the nearest of the three above temperatures by plotting temperature against compressibility of the sample. The data for temperatures near 100° F. was more complete so it was used to determine the character of the curves. The 80° and 30° data, although less complete, especially in the high-gravity range, determined the spacing of the constant curves. Since the compressibility increases with the temperature for a given hydrocarbon mixture, the curves bend more sharply toward the horizontal as the temperature increases and the spacing between the curves increases proportionately. In order to smooth the original curves and adjust the spacing of the curves for the intermediate temperatures, the values read from the curves for 100°, 80° and 30° were crossplotted by plotting curves of temperature against compressibility for various A.P.I. gravities. The values read from the constant gravity curves were in turn plotted to give the family of constant temperature curves of compressibility against A.P.I. gravity in Fig. 4.



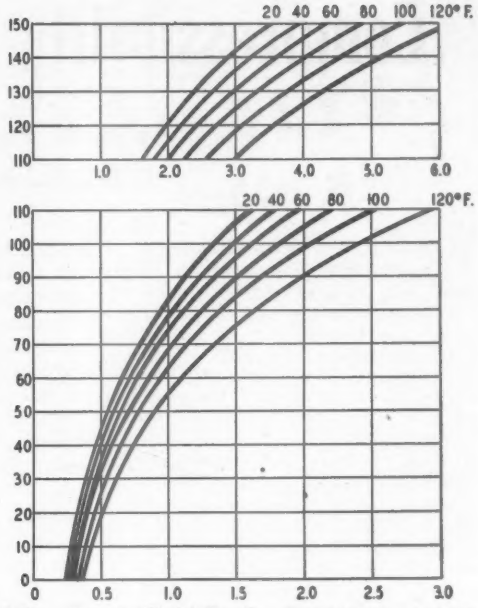


Fig. 3—(Left) A.P.I. gravity (ordinate) vs. compressibility. Fig. 4—(Right) Family of constant-temperature curves of compressibility plotted against A.P.I. gravity

It is to be noted that much of the available data did not give the temperature at which the tests were made. Neither was it apparent whether there was any dissolved gases or whether the liquid was near the bubble point in a great many of the tests; both of these conditions affect the compressibility. A comparison of existing data that was sufficiently complete, and therefore worthy of comparison with the curves in Fig. 4, showed good agreement. The average deviation below 80° A.P.I. for 23 test points on 12 samples was ±0.04 per cent per 1,000 psi. Above 80° A.P.I. the data, primarily for pure hydrocarbons, were sparse and scattered, but indicated the trend of the curves.

The correlation in the chart for inclusion in the code of recommended practice for positive displacement meters is believed to represent the best treatment of the existing data consistent with the aim to provide the compressibility factor in a convenient and usable form. The chart, Fig. 4, has its limitations, and it is hoped earnestly that new and more extensive data will be made available.

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S. D. Butcher, independent operator who recently returned from 3 years' Army service, has moved from Wichita, Kans., to Oklahoma City, where he has opened offices.

Hugh W. Field, assistant manager of Atlantic Refining Co.'s research and development department, has been elected a director. He has been with Atlantic since 1928.

TABLE 1

Sample No.	Material	Reference	°A.P.I.	Experimental compressibility factor, °F. 30	32	70	80	80.6	82.4	86	95	96.8	100	104	122	130	131
1	Propane	1	146.5	....	....	....	....	....	....	....	....	....	5.08	....	....	....	....
2	Isobutane	2	119.4	....	....	2.34	....	....	....	....	....	....	2.96	....	....	3.93	....
3	Liquefied petroleum gas	3	115.9	*(1.48)	1.50	....	(2.13)	....	2.17	....	....	2.42	(2.50)	....	....	....	....
4	n-Butane	4	110.8	....	....	2.14	....	....	....	....	....	....	2.49	....	....	3.01	....
5	n-Pentane	5	92.7	....	....	....	....	....	....	....	....	....	1.39	....	....	....	....
6	Isopentane	6	82.8	....	....	....	....	....	....	....	....	....	2.56	....	....	....	....
7	n-Hexane	6	81.6	....	....	....	....	....	....	....	....	....	2.30	....	....	....	....
8	n-Heptane	7	74.2	....	....	....	(1.07)	....	....	1.103	....	....	....	....	....	....	....
9	Aviation gasoline	3	72.1	(.80)	.81	....	(1.01)	1.02	....	....	....	....	(1.12)	1.14	....	....	1.32
10	Aviation gasoline	3	71.51	(.82)	.82	....	(1.03)	1.04	....	....	....	....	(1.16)	1.18	....	....	1.35
11	n-Decane	8	61.5	....	....	....	....	....	....	....	....	....	.90	....	....	....	....
12	Cracked gasoline	3	52.7	(.62)	.62	....	(.75)	.75	....	....	.80	....	(.82)	....	.89	....	....
13	Crystal oil +20 mass per cent n-butane	9	45.5	....	....	....	....	....	....	....	....	....	.71	....	....	....	....
14	Spindle oil	3	30.7	(.39)	.39	....	(.47)	....	....	....	....	....	(.50)	....	....	....	....
15	Lubricating oil	3	29.9	(.40)	.40	....	(.46)	....	....	.44	....	....	(.49)	....	....	....	....
16	Crystal oil	9	29.2	....	....	....	....	....	....	....	....	....	.52	....	....	....	....
17	Lubricating oil	3	29.2	(.37)	.40	....	(.42)	....	....	.44	....	....	(.45)	....	....	....	....
18	Lubricating oil	3	25.8	(.36)	.36	....	(.41)	....	....	....	....	....	(.45)	....	....	....	....
19	Lubricating oil	3	20.1	(.35)	.35	....	(.40)	....	....	....	....	....	(.43)	....	....	....	....

*Figures in parentheses are calculated values.

The Refiner's Notebook

A WEEKLY FEATURE OF THE OIL AND GAS JOURNAL

Exchanger Tubes

TENTATIVE SCHEDULE OF TOPICS

No. 83, March 2, Routing of Fluids
No. 84, March 9, Shells and Baffles
No. 85, March 16, Ammonia and Carbonate Solutions
No. 86, March 23, Exchanger Tubes
No. 87, March 30, Standard Exchanger Tubing
No. 88, April 6, Coefficient of Expansion
No. 89, April 13, Velocity in Shells of Exchangers
No. 90, April 20, Surface Required in Exchangers
No. 91, April 27, Transfer Rates in Tubes

Notebook 87 (March 30) will show the dimensions of tubes.

BRASS, steel, and chromium steel tubes are used almost exclusively although there are a few installations of Cupro-nickel, Inconel, nickel, Monel, Karbate (compressed carbon), tantalum and silver for conditions of extreme corrosion, mainly of a chemical nature.

Admiralty metal or copper-base tubes are used almost exclusively for water-cooled condensers and coolers, and this service constitutes more than half and in some refineries even 80 per cent of the exchanger installation. Several typical copper-base alloys are shown in Table 1 as well as other tubing materials. Brasses withstand the corrosion action of hard or brackish water better than any common materials. However, if the crude oil contains substantial amounts of brine (generates hydrochloric acid) it may be necessary to use steel tubes. Ammonia is widely used to neutralize the action of the hydrochloric acid and ammonia dissolves copper-base alloys at a rapid rate. If an excess of ammonia never occurs the use of copper-base alloys is excellent but most refiners cannot be sure that excess ammonia will not, on some occasion, be used. For extreme acid (hydrochloric) corrosion Cupro-nickel, Monel metal, or Inconel tubes may be justified.

Copper-base alloys are poor resistors to hydrogen sulfide and hence steel or chromium steel are used if the oil contains or generates hydrogen sulfide. For mild sulfide corrosion plain steel or brasses may be used, for regular sulfide corrosion 5-7 per cent chromium tubes will suffice, but for extreme corrosion as with cracking-plant condensers operating on West Texas oils, even higher chromium content may be justified (see The Refiner's Notebook No. 22, Feb. 16, 1944). For oil-to-oil equipment plain or chromium steels are always employed.

Sizes ranging from 1¼ in. down to ⅝ in. o.d. are common and occasionally ½ and ⅜-in. tubes are used for special conditions. Sizes smaller than 1 in. o.d. No. 11 B.W.G. cannot be readily cleaned or scraped and lengths greater than 10 ft. cannot be cleaned. Although internal pressure seldom calls for thick tubes, corrosion and erosion allowances, the need of mechanical strength in handling the tubes or long bundles, and the greater ease with which thick tubes can be rolled into the tube sheets, make the thicker gages (B.W.G. 10 and 14) most popular although gages of 12 to 18 may be used for very small tubes.

Although the minimum distance between adjacent tubes can be 3/16 in. (smallest tubes) to 5/16 in., spaces of ⅜ in. are common because of the greater ease of cleaning. Thus, center-to-center spacings are somewhat as follows:

	Tube diameter o.d., in.			
	⅝	¾	1	1¼
Triangular spacing, in.	11/16 to 13/16	13/16 to 1 1/16	1¼ to 1⅜	1 5/16 to 1⅝
Square spacing, in.	⅞ to 1	1 to 1⅛	1¼ to 1½	1 7/16 to 1¾

Square or rectangular arrangements are used for vacuum condensers, condensers, equipments in which the pressure drop through the shell must be a minimum, or if exceedingly dirty stocks are being handled.

TABLE 1—EXCHANGER AND CONDENSER TUBING

	Percentage composition							Tensile strength psi.	Yield point psi.	Elongation (%)	Hardness Brinell	Physical properties change at
	C	Cu	Zn	Sn	Ni	Al	Cr					
Common materials—												
Carbon steel	.15	..	..	..	..	..	..	60,000	35,000	30	.....	800° F.
5-7 Per cent chromium steel	.15	..	..	..	..	..	6	.....	.....	..	.....	800° F.
Admiralty metal	..	70	29	1	..	..	..	50,000	20,000	40	.....	482° F.
Copper base alloys—												
Red brass	..	85	15	..	..	..	..	42,000	15,000	40	50-120	482° F.
Aluminum bronze	..	95	..	..	..	5	..	45,000	25,000	40	.....	482° F.
Aluminum brass	..	76	22	..	..	2	..	52,000	15,000	50	.....	302° F.
Cupro nickel	..	80	..	..	20	..	..	50,000	20,000	50	.....	572° F.
Arsensical copper	..	100	(.15-.75% arsenic)				..	35,000	12,000	40	.....	482° F.
Miscellaneous alloys—												
Monel metal	.15	30	..	..	67	..	..	80,000	40,000	40	.....	.....
Inconel	.08	..	..	..	79	..	13	80,000	40,000	40	.....	700° F.
Stainless steel, annealed	.08	..	..	..	8	..	18	85,000	40,000	55-60	135-185	900° F.
Karbate	(plasticized and compressed carbon)							2,500	.....	..	.....	340° F.

No. 86 in a series by W. L. Nelson, professor of petroleum refinery engineering, University of Tulsa

You Oil Men have a hand in these increases

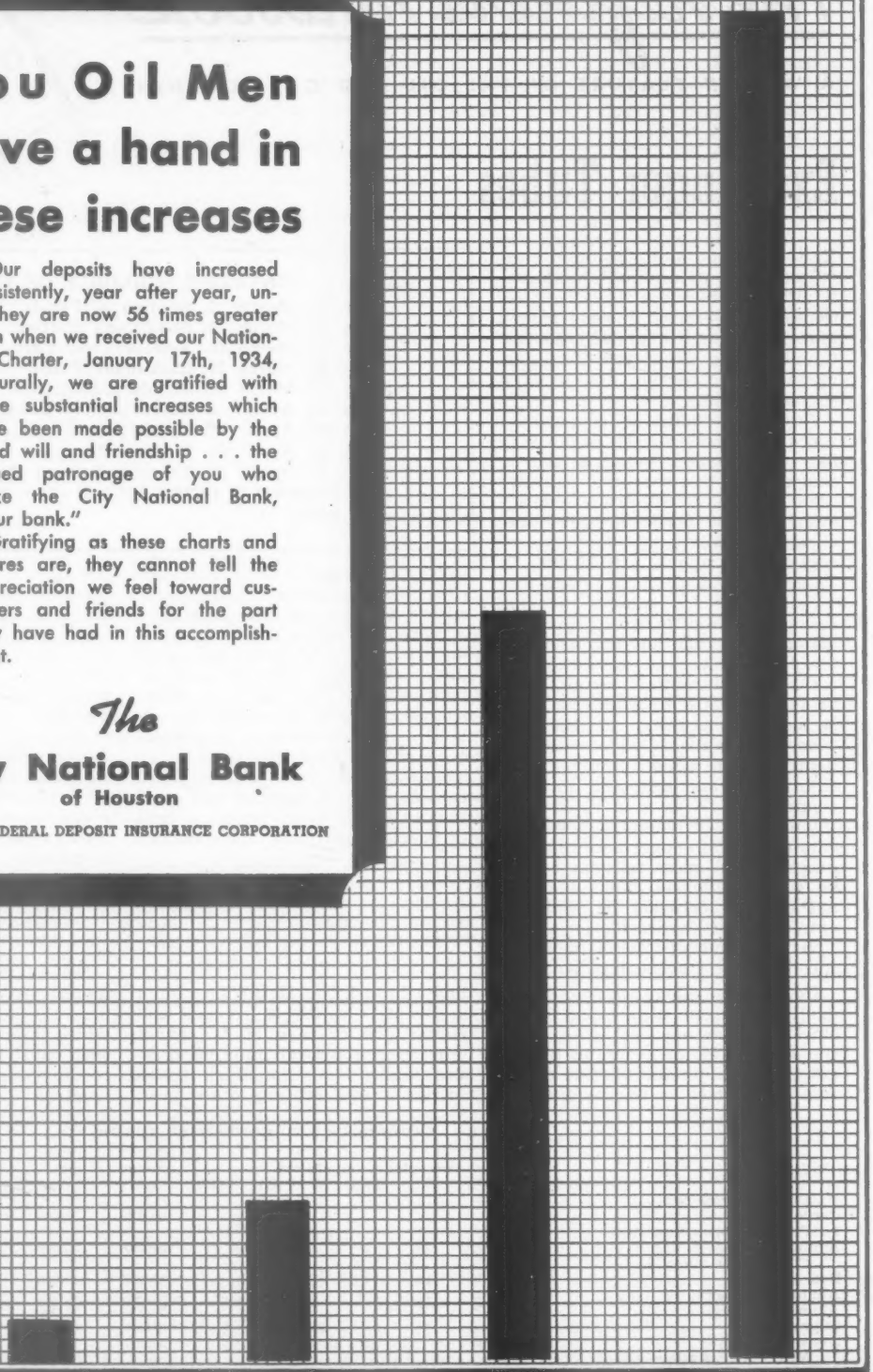
Our deposits have increased consistently, year after year, until they are now 56 times greater than when we received our National Charter, January 17th, 1934, Naturally, we are gratified with these substantial increases which have been made possible by the good will and friendship . . . the valued patronage of you who make the City National Bank, "your bank."

Gratifying as these charts and figures are, they cannot tell the appreciation we feel toward customers and friends for the part they have had in this accomplishment.

The

City National Bank
of Houston

MEMBER FEDERAL DEPOSIT INSURANCE CORPORATION



Deposits:	Jan. 17, 1934	Dec. 31, 1938	Dec. 31, 1943	Dec. 31, 1945
	$2,882,866.00	$13,321,429.00	$61,073,004.00	$112,002,040.00

A FEATURE OF THE OIL AND GAS JOURNAL

Lenticular Reservoirs

IN rather exceptional instances reservoirs bounded by permeability traps may be limited to all directions by disappearance of permeability and then conform to isolated lenticular areas of permeability. (Fig. 1). Such conditions can be due to normally interbedded porous lenses, to erratic inclusions of porous rock, or to lenticularity in permeability conditions. The latter may be caused by variation in texture, variation in cementation, restriction of continuity on account of cross-bedding, or in connection with secondary solution, as in limestones. Reservoirs in such isolated, lenticular zones of permeability may be called "lenticular reservoirs."

This family of reservoirs is generally characterized by the absence of free water or by an insignificant accumulation of water in low places of the porous lenses. Their productive behavior, of course, follows the gas-drive depletion pattern. No structural control is required for the presence of lenticular reservoirs, and they may exist on practically any type of structure or in an area where no structure is present. The Davis sand lens of the Hardin field, Texas, is an example of a lenticular reservoir located on an anticline.

Among the outstanding lenticular types are the shoestring sand reservoirs of the Mid-Continent region, occurring in areas without structural relief. The reservoirs are located in sands of Pennsylvanian age variously interpreted as beach, offshore bar, and channel-fill deposits. The actual reservoir limits are formed either by the shale boundaries or by gradation in the sorting of the sands; differential sorting also influences their productivity. Typical examples are Burbank, Okla.; Bush City and Chanute, Kans.

Appalachian Conditions

Certain gas reservoirs in narrow, winding belts of sand as found in the Appalachian region are classified as lenticular reservoirs, for example, the Berea sand trend in West Virginia, which crosses a system of gently folded structures. In this trend accumulations of oil are trapped below the gas layer at structurally low points where the sand belt bridges synclinal depressions. Such oil pools belong to the typical synclinal oil reservoirs of the Appalachian province (Fig. 2).

Other restricted porous complexes may provide conditions of lenticular reservoirs where favorably located with respect to source beds or to channels of migration; for instance, erosion remnants, erosion pockets, or detrital material on unconformities like the Sooy conglomerate on the Central Kansas uplift, as in the Wherry pool. Erratic igneous reservoir rocks are found in volcanic flows or sills with porosity that may be primary or due to fracturing or decomposition. Petroleum accumulations in such igneous rocks are classified in the family of lenticular reservoirs when only small quantities of free water are present, for example, serpentine fields near the Balcones fault zone, Texas.

Finally, if a petroleum reservoir occurs in the porous tectonic breccia of an overthrust plane, the chances are that such a reservoir is completely sealed by impervious formation, and that it belongs, therefore, to the lenticular reservoirs.

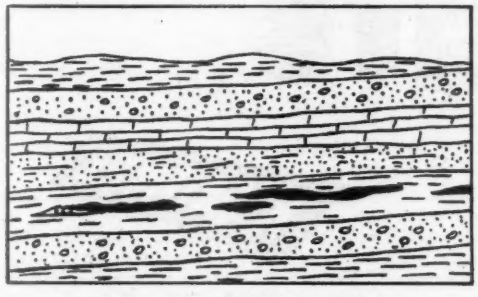


Fig. 1—Lenticular deposits of oil

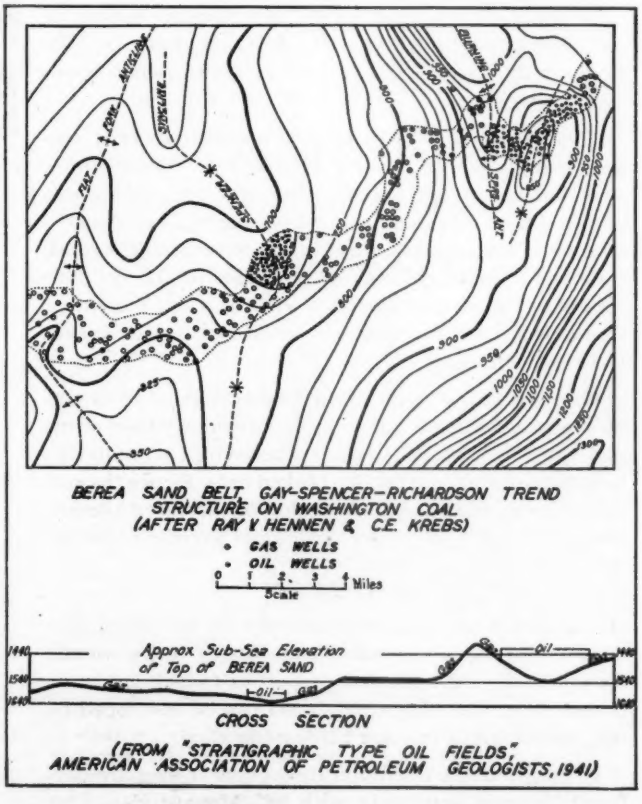


Fig. 2—Synclinal oil reservoirs

Series prepared by Dr. O. Wilhelm, Shell Oil Co., Inc. (A. A. P. G. Bulletin Vol. 29, No. 11)

Never give corrosion an even break

...use SUCKER RODS of "K" Monel

When a sucker rod broke every 50 days . . .

. . . and the entire string had to be replaced every 5 months . . .

. . . operators of Arrington No. 2 well in the Howard Glasscock Field at Big Spring, Texas, made a wise move.

OUT went the rods which had given so much trouble. Into Arrington No. 2, on November 26, 1941, went a string of ¾-inch "K" Monel* sucker rods manufactured by W. C. Norris Manufacturer, Inc., Tulsa, Oklahoma.

On December 7, 1945—after 1471 days of continuous service in this corrosive well—E. G. Rodman of The Rodman Supply Company, Odessa, Texas, owner of the lease, reported:

"The string of 'K' Monel rods installed in 1941 was used every day—24 hours a day—in 2½" tubing with a 2¼" barrel until July 1944, when the 2½" tubing was replaced with 3" tubing and a 2¾" barrel (42" stroke—20 strokes per minute). Despite the considerable load increase as a result of installing the larger tubing, we have continued to use the same rods without a single break or shut-down due to rod failure. In addition, the rods appear to be as good as new."

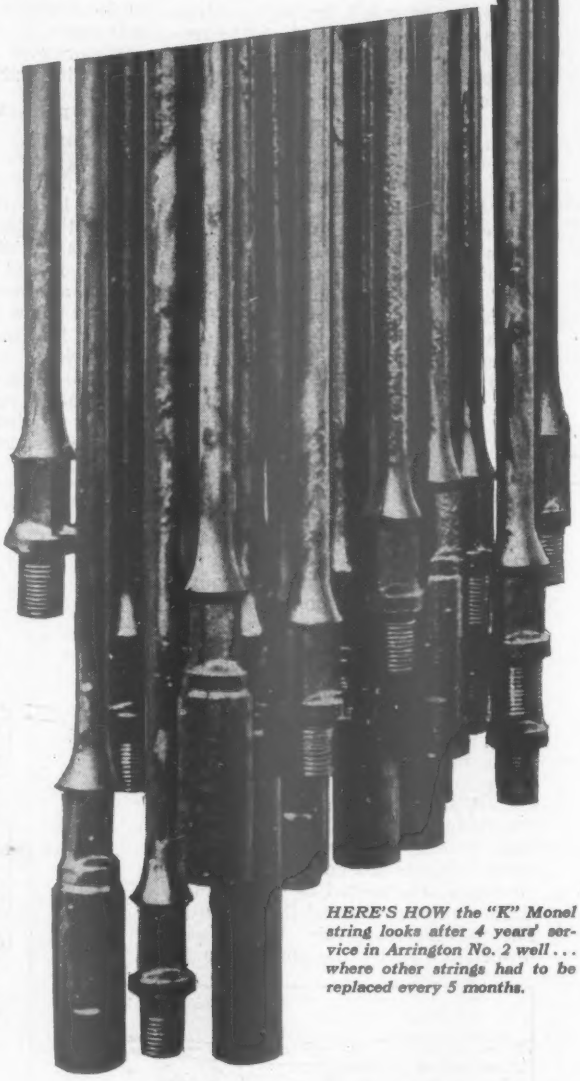
Compare this with the normal expectancy of 29 breaks which would have occurred in the previously used string during a 4-year period. Consider the savings in not having to pull the string and fish for broken rods. Figure the savings in manhours... and the value of increased production. And, don't forget the *additional* savings in sucker rod costs.

* * *

"K" Monel is proving its superiority for use under conditions that rapidly weaken and destroy many metals. Exceptionally high physical properties (which are maintained under corrosive conditions) can be developed by heat treatment of this age hardenable alloy.

For dependable operation throughout a long, trouble-free life, equip your wells with "K" Monel rods.

THE INTERNATIONAL NICKEL COMPANY, INC.
67 Wall Street, New York 5, N. Y.



HERE'S HOW the "K" Monel string looks after 4 years' service in Arrington No. 2 well . . . where other strings had to be replaced every 5 months.

"K" MONEL

NICKEL INCO TRADE MARK **ALLOYS**

MONEL* • "K" MONEL* • "KR" MONEL* • "R" MONEL* • "S" MONEL* • INCONEL* NICKEL • "L" NICKEL* • "Z" NICKEL*

*Reg. U. S. Pat. Off.

OIL AND GAS EQUIPMENT Digest

IT'S NEW ✓ CHECK IT

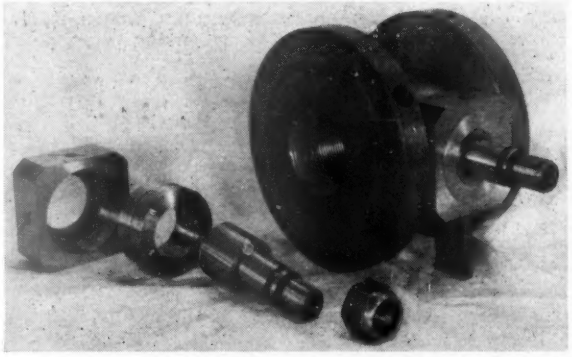
by Joe Cahill

(1) TWIN-ENGINE EXECUTIVE PLANE is this company's answer to the postwar air-minded traveler. Powered either with 450 or 525-hp. engines this ship cruises between 211 and 224 m.p.h. at 10,000 ft. Service ceiling is 22,000 ft. Capable of carrying eight passengers and a crew of one or two along with 1,200 lb. of baggage, this

new plane features an improved landing gear, softer in action to smooth out imperfect landings and facilitate taxiing on rough, unprepared fields. Cabin interiors have been redesigned for passenger comfort and a new instrument panel eases pilot handling. *Beech Aircraft Corp.*

IT'S NEW ✓ CHECK IT

(2) DUAL-BEARING CROSS HEAD for reciprocating pumps and engines permit ease of replacement and economy in maintenance. Turning block 90° results in new bearing surfaces, giving longer life. Large wearing



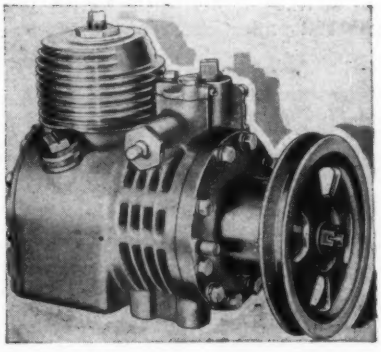
surfaces reduce pressure on spool. Interchangeable parts for various sizes of pumps of the same make. Easily replaced by unskilled labor without special tools. Construction permits replacement of worn parts rather than the whole assembly. *Ventura Tool Co.*

IT'S NEW ✓ CHECK IT

(3) CONTROLLER FOR TEMPERATURE RATE OF RISE. For batch-type processes and other operations where rate of temperature increase or decrease must be controlled, as well as the actual processing temperature and duration. Controls and records all the steps of complete process cycle. No time cams or supplementary instruments are employed. Completely automatic, according to whatever schedule is predetermined by adjustments of four setting knobs on instrument panel. *The Foxboro Co.*

IT'S NEW ✓ CHECK IT

(4) IMPROVED ROTARY COMPRESSOR. This type of compressor utilizes the rotary principle. Four overlapping compressions occur during each revolution to produce thousands of air impulses per minute thus eliminating pulsations in the discharge line, as well as fluctuations in the torque loading. Ideally suited for a belt as well as direct drive and available in clockwise or counterclockwise rotation. Equipped with sleeve bearings, the units are available either as water



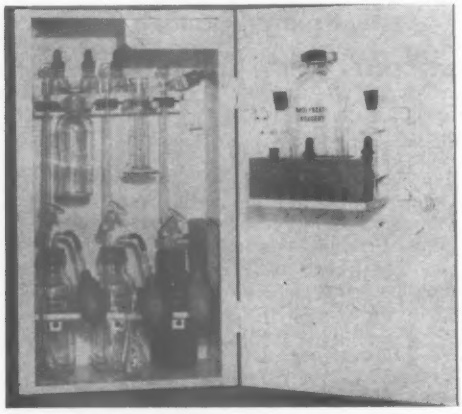
The Oil and Gas Equipment Digest presents a review of what is new in equipment and trade literature . . . makes it possible for readers to obtain full information on every subject by use of convenient "Check It—Mail It" service card. This periodic feature of The Oil and Gas Journal will include all that is new in equipment . . . at a time when new products are being introduced, and existing products improved.

Keep Informed. Save Time. Tear Out Card. Check It. Mail It.

cooled in 10-cu. ft. size and water or air cooled in the standard 7½- cu. ft. size. The air-cooled unit can be used where compressed-air requirements are not sufficient to require the aid of water cooling. *Wagner Electric Corp.*

IT'S NEW CHECK IT

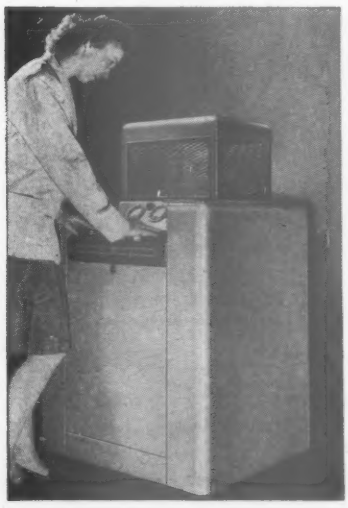
(5) NEW "TESTMASTER, JR." UNIT makes essential tests for hardness, alkalinity to phenolphthalein and methyl orange, chloride, for maintaining suitable boiler feed or process water conditions. Contains in one practically arranged cabinet the complete apparatus and



reagents for making these tests. Where it is desired to incorporate wide-range pH and phosphate determinations, the same cabinet, without modifications, will accommodate the phosphate tray and the pH test unit. *Trutest Laboratories, Inc.*

IT'S NEW CHECK IT

(6) A NEW STANDARD 2-KW (OUTPUT) DIELECTRIC HEATER which operates on a frequency of 27 megacycles is designed for simplicity of control and constructed for continuous industrial duty. Employs proven circuits and methods to achieve the utmost reliability. Frequency can be varied through a wide range by a front panel control and an automatic timer controls heat sequence from 2 seconds to 20 minutes as selected. Oven is completely shielded to eliminate undesirable radio-frequency radiation. *Allis-Chalmers Mfg. Co.*

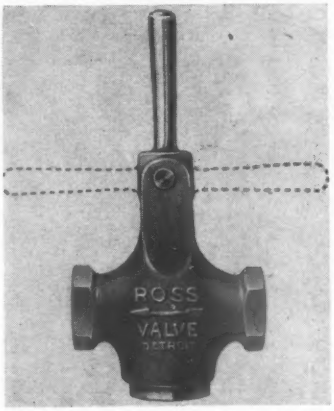


IT'S NEW CHECK IT

(7) NEW GAS MASK AND SPLASH HOOD gives full head and respiratory protection where toxic gases and fumes are accompanied by the hazard of splashes of acids, caustics, etc. Uses straight canister type for emergency and short periods; for longer periods has hose for attaching to compressed air line. *Industrial Products Co.*

IT'S NEW CHECK IT

(8) NEW SHUT-OFF VALVE, primarily designed for use in air lines, also is recommended for use in gas and low-pressure liquid lines. Outstanding features are: (1) Full flow, (2) quick acting, (3) self-locking, locks automatically in both closed or open position, (4) positive shutoff, line pressure provides leak-proof seal, (5) visual indicator, position of shut-off lever indicates whether valve is closed or open. Four standard sizes, ¼ in., ⅜ in., ½ in., and ¾ in. *Ross Operating Valve Co.*



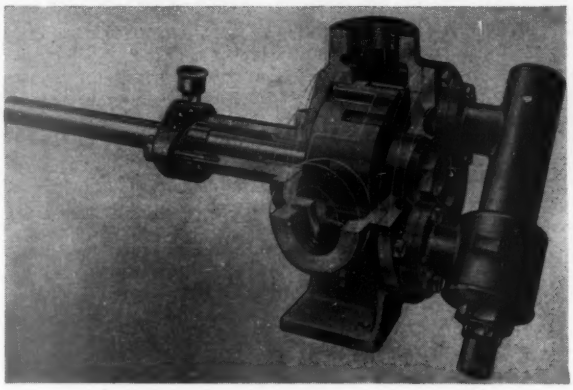
IT'S NEW CHECK IT

(9) SHOOTING-TRUCK BODY. Compact design reduces weight by 25 per cent over former types. All side compartments easily accessible from the ground. Main dynamite storage located in the center of the body. Water tanks are filled by means of a vacuum system which results in a great saving of time when the water must

be picked up from storage which has no pumps. The body is so constructed that there are no inaccessible pockets to accumulate water and mud and cause rust. Reels are sturdily mounted and well protected. *Revell Engineering Co.*

IT'S NEW CHECK IT

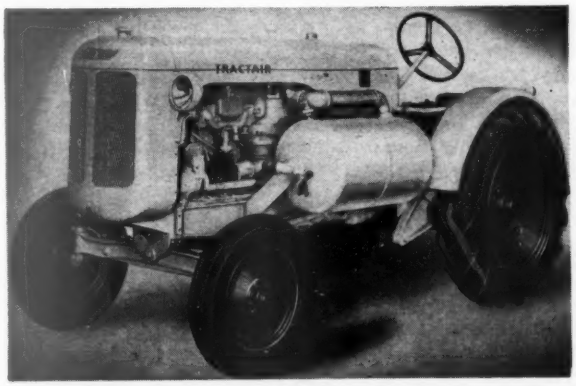
(10) HAZARDOUS-LIQUID PUMPS listed under the Re-Examination Service of Underwriters' Laboratories, Inc. These specially built units are now available in sizes of 5, 10, 18, 20, 35, 50, 90, 200, and 300 g.p.m. and various mounting styles, including back-geared drive, V-belt



drive, direct-connected and flat-belt drive. Five-gallon-per-minute sizes have integral relief valve mounted on top of pump casing and in all other sizes the relief valve is mounted directly on the pump head. All are equipped with extra-long stuffing box. Stainless-steel shafting is standard. *Viking Pump Co.*

IT'S NEW CHECK IT

(11) COMBINATION TRACTOR-COMPRESSOR UNIT incorporates an integrally built 105-c.f.m. compressor with a 35-hp. wheel tractor, retaining complete and dual utility of both units and resulting in exceptional mobility over all types of terrain. Brings both pneumatic



and mechanical power to applications heretofore inaccessible. A full complement of front and rear mounted power equipment is available and add further to the multi-purpose utility of this machine. *Le Roi Co.*

IT'S NEW CHECK IT

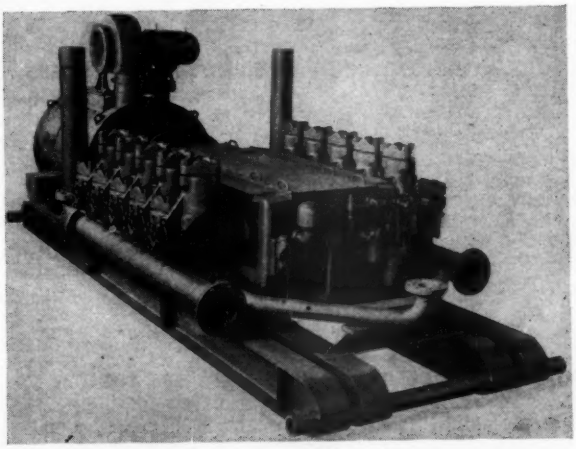
(12) AUTOMATIC WATER UNLOADER FOR AIR COMPRESSORS up to 10 hp. with a pressure range of from 75 psi. upward. Operation is simple. Whenever the compressor stops, the pressure in the storage tank forces moisture in the bottom of the tank out through ports in the water unloader, bleeding moisture from the tank, assuring clean, dry air at all times. *Gray Co., Inc.*

IT'S NEW CHECK IT

(13) NEW FULL-VIEW ROTAMETER, for accurate flow rate measurement and control, is designed specially to stand up in the tough services and corrosive conditions encountered in the process industries. Design is based on simple square block and fittings, fastened together rigidly by heavy flat side plates. "Safety-Shielding" is obtained by front and back safety glass windows, ¼ in. thick, held in place by stainless-steel window frames, 3/32 in. thick. All surfaces are gasketed to prevent leakage. Float position can be read, even from an angle. The metering tube replaced without taking the meter out of the line. Meter parts treated to prevent external corrosion. Available as a simple flow-rate indicator or with remote instrument for recording or recording-controlling-flow rate. Flow totalization can also be included. *Brooks Rotameter Co.*

IT'S NEW CHECK IT

(14) TWIN-LINE PUMPS, built in 6, 10, and 14 cylinders, operate at continuous speed of 400 to 500 r.p.m. Permit use of direct-connected prime movers. Basic design comprises central crank shaft in enclosed box with pump cylinders on opposite sides of crank shaft. One connecting rod operates two plungers. In effect, two



separate and independent pumps tied together 180° apart. With separate suction and discharge connections to each side, it is possible to pump two kinds of liquids at one time against different discharge pressures. Outside packed plungers, 2,000 p.s.i. working pressures, with 4-in. diameter plungers and 3-in. stroke giving moderate piston speed, are features. *The Cooper-Bessemer Corp.*

IT'S NEW CHECK IT

TRADE LITERATURE

(15) A NEW PRESSURE-REGULATING-VALVE CATALOG has just been released, covering direct-operated and pilot-operated spring-loaded valve for steam, air, and gas service with sizing information. This catalog also contains a new fabricated steel separator of advance design with important facts on sizing both separator and trap for automatic drainage. *Strong, Carlisle & Hammond Co.*

IT'S NEW ✓ CHECK IT

(16) SAFETY EQUIPMENT. This new, complete 178-page catalog describes and illustrates a complete range of safety equipment for industrial application, including many new products. A six-page introductory section illustrates and describes the complete research laboratories and plant facilities of this company. *Mine Safety Appliances Co.*

IT'S NEW ✓ CHECK IT

(17) GRAPELAND CYCLING PLANT OPERATING DATA. The Grapeland Cycling Plant at Grapeland, Tex., is out of the ordinary in that it shows what can be done with cycling by smaller independent producers. At Grapeland, the scale of distillate recovery operations is reduced considerably under those of the larger plants. For that reason, this reprint will round out your information on the subject. *Clark Bros. Co., Inc.*

IT'S NEW ✓ CHECK IT

(18) COMPLETE INFORMATION on a new chemical-resistant maintenance paint is given in this four-page illustrated bulletin. Illustrations of typical jobs show how this quick-drying, odorless protective coating is readily applied to heated, wet, and porous surfaces of all kinds. Unretouched photographs of test strips demonstrate the protection provided by a single coat against hot acids, alkalis and water, and other distinctive features are explained in detail. *Chemical Products Co.*

IT'S NEW ✓ CHECK IT

(19) ALKYLATION ACID REGENERATION PROCESS. New bulletin describes an efficient method of regenerating spent sulfuric acid to obtain fresh 98 per cent acid from spent sludge. Includes a large diagrammatic arrangement of the process, with an accompanying explanation of each step and apparatus used in the process. Among the features mentioned are the economical method of forming makeup acid, the elimination of fuel for maintaining the furnace temperature, and the convertibility of the plant to processing other refinery acid sludges. *Chemical Construction Corp.*

IT'S NEW ✓ CHECK IT

(20) "FIFTY FACTS" gives the actual experiences of 50 manufacturers in improving their tools by new processes of heat treating. It furnishes proof that more than half of the tools in common use today can be made to work longer and better by the use of the right kind of hardening treatments. *Perfection Tool & Metal Heat Treating Co.*

IT'S NEW ✓ CHECK IT

(21) WELDED FABRICATION. A new engineering manual entitled, "Tailoring in Metal," discusses the factors affecting the choice of welded fabrication and the techniques of welded design. The purpose of the manual is to help engineers and designers decide for themselves whether fabrication by welding and the materials made available by this method are applicable to the problem. Various types of welds are explained, and how they affect static and fatigue load values. Of particular interest is specific information about devices which can be employed to reduce cost and improve construction. The methods are profusely illustrated with drawings and photographs. *The United Welding Co.*

IT'S NEW ✓ CHECK IT

(22) ARC WELDING. Two new folders covering arc welding accessories and arc-welding electrodes are now available to the welding trade. Handy pocket-size, they describe application, procedure, physical properties and sizes for electrodes, and catalog numbers for the accessories. *The Hobart Brothers Co.*

IT'S NEW ✓ CHECK IT

(23) REFINERY SAFETY SCORE SHEET. A 24-page notebook containing a check list based on the experiences of a refinery safety engineer. Serves as a convenient field book to focus attention on hazards which might pass unnoticed. Alternate pages contain check sheets and last two pages are blank for notes. *Benson & Associates.*

IT'S NEW ✓ CHECK IT

(24) LIQUID-LEVEL GAGES. A four-page illustrated leaflet describes manufacturer's liquid level gages of the reflex and transparent types as well as gage valves. Prices and operating information are also given. *Jerguson Gage & Valve Co.*

IT'S NEW ✓ CHECK IT

(25) OIL-FIELD SPECIALTIES. New 12-page, loose-leaf booklet contains specifications, pictures and price lists of slush pump liners and piston rods. New specialties are listed for each standard make of pump. *Machine Products Co.*

IT'S NEW ✓ CHECK IT

(26) DRILLING ENGINES. New multicolored pamphlet contains operating pictures, specifications and features of drilling engines built by well-known manufacturer. Performance curves and installation diagrams are included. *Superior Engine Division of National Supply Co.*

IT'S NEW ✓ CHECK IT

The Oil and Gas Equipment Digest presents a review of what is new in equipment and trade literature . . . makes it possible for readers to obtain full information on every subject by use of convenient "Check It—Mail It" service card. This periodic feature of The Oil and Gas Journal will include all that is new in equipment . . . at a time when new products are being introduced, and existing products improved.

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Welded seals in RECTORHEADS have a degree of permanency unattainable by resilient seals. Rectorhead welding does not deteriorate, necessitating costly workovers at regular intervals and loss of production as is the case with resilient seals.

Because of this simplified construction, assuring good welds quickly and easily, RECTORHEADS can be successfully installed in minimum time and without necessity of re-welds. REMEMBER, IT'S THE DESIGN TO WHICH WELDING IS APPLIED THAT ASSURES SAFE, STRONG, DEPENDABLE WELDED SEALS. When you hook-up your wells use RECTORHEAD for utmost simplicity . . . for greater strength and safety over the longest period of time.

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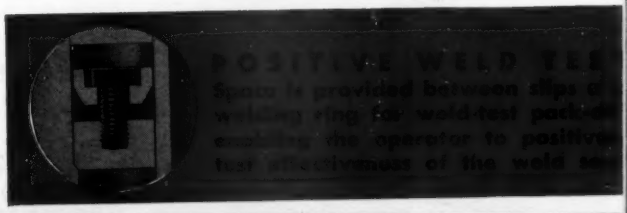

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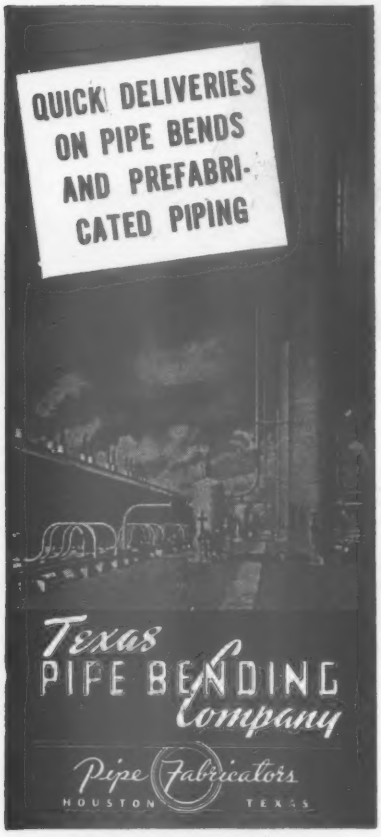

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REFINING

Standard of California Leases Part of Plant

SAN FRANCISCO.—A 100-octane plant at Bakersfield, Calif., operated during the war by Mohawk Petroleum Co., has been leased in part from the Government by Standard Oil Co. of California.

A company announcement said about one-third of the facilities will be operated, and the remainder maintained for Reconstruction Finance Corp. which retains the right to dispose of the idle portion at any time.

The plant has been declared surplus by RFC. California Standard's lease is for a minimum of 2 years and is subject to cancellation by either party on 1 year's notice.

U. S. Offers to Sell Six War Refineries

WASHINGTON.—Six refineries with an aggregate daily capacity of more than 24,000 bbl. of high-octane gasoline have been placed on the market by the Government.

The War Assets Corp. offered the plants for sale or lease. Wartime operators, location, and daily capacity of the plants follow:

Utah Oil Refining Co., Salt Lake City, 5,500 bbl., 100-octane.

Root Petroleum Corp., El Dorado, Ark., 1,990 bbl., 100-octane.

Ashland Oil & Refining Co., Catlettsburg, Ky., 5,300 bbl., 100-octane.

Frontier Refining Corp., Cheyenne, Wyo., 1,650 bbl., 100-octane, and 1,300 bbl., motor gasoline.

J. S. Abercrombie and Harrison Oil Co., Sweeny and Freeport, Tex., 8,500 bbl., 100-octane; 3,500 bbl. army and all-purpose gasoline; and 1,700 bbl., 91-octane.

Pennzoil Co., Oil City, Pa., 1,685 bbl., 100-octane. Announcement concerning the offering of this plant was made earlier.

Fuel Oil Stocks Decline In Gulf Coast Plants

HOUSTON.—Generally conforming to the national pattern, gasoline stocks in 10 Gulf Coast independent refineries increased during the last half of February while diesel and fuel-oil inventories dropped.

Stocks of all grades of gasolines and naphthas rose 108,469 bbl. during the 2-week period and were reported at 2,189,037 bbl. Automotive gasoline stocks, at 1,246,845 bbl. March 1, showed an increase of 136,841 bbl. Aviation gasoline stocks were reported at 394,567 bbl., an increase of 32,533 bbl.

The only exception to the stock drop in the fuel oil group was Bunker C oil which showed a small increase of 3,434 bbl. to stand at a total of 364,770 bbl. March 1. Diesel gas oil stocks dropped 12,334 bbl. to 50,382 bbl. Stocks of other grades of gas oil decreased 230,681 bbl. to 517,846 bbl. during the period. No. 5 fuel oil stocks dropped 191,613 bbl. to 38,511 bbl. Kerosene, however, increased its stock position, rising 60,215 bbl. to 291,717 bbl.

Runs to stills in the plants totaled 110,998 bbl. daily—87.4 per cent of rated operating capacity. Total stocks

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in the plants stood at 3,351,263 bbl. March 1, an over-all decrease of 262,517 bbl. Normal prewar stocks of all products ranged around 5,000,000 bbl.

New Company to Design And Build Refineries

PHILADELPHIA.—A new company to engage in design and construction of refineries and refinery equipment has been organized here with T. Ellwood Webster, former Sun Oil Co. official, as president.

The new company, Catalytic Engineering & Construction Co., will specialize in work on catalytic units, employing processes licensed by the Houdry Process Corp. of both fixed bed and Thermofor moving-bed types. Other officers include Alan T. Knight, vice president, and W. Graham Jamison, secretary-treasurer. Knight formerly was manager of maintenance and construction at Sun's Marcus Hook plant, and Graham formerly was chief accountant in Sun's general accounting department. Webster formerly was assistant to the president in the Sun organization. Directors are Webster, Knight, Arthur E. Pew, Jr., Sun vice president in charge of manufacturing and research; Clarence H. Thayer, Sun's chief engineer; and Robert G. Dunlop, comptroller and a director of Sun.

Rutgers University Given Models of Bayway Units

NEW BRUNSWICK, N. J. — Scale models of a pipe still, pentane unit, and a catalytic cracking unit at the Bayway refinery of Standard Oil Co. of New Jersey have been presented by the company to the engineering school of Rutgers University by the company.

Built by Bayway engineers at a cost of $15,000, the models will be used to give chemical and engineering students a better opportunity to study refining processes. They were presented to the university by M. J. Rathbone, president of the company.

Shell Literally Scrapes Bottom for 200,000 Bbl.

WILMINGTON, Calif.—More than 200,000 bbl. of heavy residue fuel oil, a commodity now in critically short supply, have been salvaged by Shell Oil Co., Inc., personnel from the huge Reservoir No. 4 of the company's refinery here.

Contractors had refused to bid on the job of cleaning out the bottom of the reservoir which, except for the residue, had been drained by heavy war demands for fuel.

Realizing that each barrel of the residue used as boiler fuel released more oil for the Navy, Shell personnel set to work. The residue is solid except when worked or heated, so the method adopted consisted of working the mass with a bulldozer until it began to flow and pulling the fluid with a drag to a sump where sticks, rocks, and other debris are screened out. Steam then heats the fluid until it can be pumped.

An estimated 60,000 bbl. of residue remain to be dredged out. Shell also is salvaging a half million board feet of sheathing, another half million board feet of rafters and a sizable quantity of girders, columns, and braces — all needed in view of the lumber shortage.

Reservoir No. 4, 1,000 ft. long, 425 ft. wide on the bottom, and 29 ft. deep, has been a landmark in this section of California since it was built in 1922 for the refinery's surplus fuel oil. Its storage capacity was 2,000,000 bbl.

The mucky job of salvaging the residue from the bottom is being accomplished by a group headed by Carl Frey, general foreman, and Russell Beard, job foreman.

Rubber Plant for Sale

WASHINGTON.—A synthetic rubber plant which was operated by Dow Chemical Co. adjacent to its magnesium plant at Velasco, Tex., has been offered for sale or lease by the War Assets Corp.

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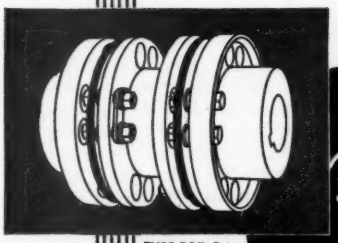

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PIPE LINES

U. S. Gets $40,000,000 Offer for Inch Lines

WASHINGTON.—A proposal to buy the Government's big-inch lines as an alternative to constructing its own Texas-New York natural gas pipe line has been made by Transcontinental Gas Pipeline Co.

The company is offering $40,000,000 for the big-inch, little big-inch, and Southwest Emergency pipe line, war-built crude and products carriers which cost the Government a total of $151,930,000.

The company said another $40,000,000 would be required to convert the lines to gas carriers. It would ask the Reconstruction Finance Corp. for 75 per cent of the sum required, pledging all revenue after interest and dividends for the next 5 years to retire the loan.

Transcontinental, of which Claude A. Williams, Austin, Tex., is president, asked the Federal Power Commission for a certificate of convenience and necessity to cover its proposed operation. If unsuccessful in buying the Government lines, the company said it would build a 26-in. welded steel line from Texas to Pennsylvania, New Jersey, and New York with a capacity of 300,000,000 cu. ft. daily. Construction costs were placed at $80,000,000. Another 26-in. line would be built later after the market is developed. This project Transcontinental would finance by $70,000,000 in 3-per cent first mortagage bonds, $3,300,000 of common stock, and $6,700,000 in 5-per cent preferred stock.

The proposal to buy the big-inch lines was another entry in the troubled record of the Government's efforts to dispose of the property. A Ford, Bacon & Davis engineering survey for RFC originally favored use of the lines for gas, but this recommendation was discarded by the Surplus Property Administration which has been succeeded by War Assets Corp.

In view of SPA's recommendations, disposal of the lines for use in transporting gas is regarded as difficult. The big-inch is a 24-in. carrier extending 1,340 miles from Longview, Tex., to New York. Its capacity is 300,000 bbl. daily. Cost was $78,500,000. Little big-inch, a 20-in. products line with a capacity of 235,000 bbl. of gasoline daily, runs from the Texas Gulf area to New York. Its cost was $67,300,000. Southwest Emergency Pipe Line extends 154 miles from Refugio, Tex., to Houston, and was built at a cost of $6,130,000.

Arguments Set March 25 In FPC Pipe Line Cases

WASHINGTON. — Oral arguments will be heard here March 25 by the Federal Power Commission in consolidated proceedings involving the applications of three pipe line companies to construct additional gas-delivery facilities in Iowa and Illinois.

Natural Gas Pipeline Co. of America and Texoma Natural Gas Co. are seeking authority for projects to enable them to deliver more gas for distribution in communities in the two states. Chicago District Pipe Line Co. has applied to the commission for permission to construct lines paralleling its Crawford line in the Chicago area to increase capacity of the line to receive deliveries from Natural Gas Pipeline.

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At the same time, the commission announced hearings will be resumed in Detroit April 15 on the application of Natural Gas Pipeline to construct facilities to deliver natural gas to various companies at the Illinois-Wisconsin line. In a related case, also to be heard April 15 in Detroit, Michigan-Wisconsin Pipeline Co. is asking permission to construct and acquire facilities to service a number of communities in Illinois, Iowa, and Wisconsin.

New York-Pennsylvania Loop Proposed in Request

WASHINGTON. — A proposal to complete an integrated pipe line system in western Pennsylvania and New York by the construction of about 20 miles of loop line has been placed before the Federal Power Commission by Iroquois Gas Corp. and United Natural Gas Co.

The two companies are asking permission to construct the 16-in. loop line beginning about 2½ miles south of Pennsylvania-New York line at a United bypass in McKean County, Pennsylvania, to another bypass of Iroquois in Cattaraugus County, New York. Iroquois obtains natural gas from United through the system to which the addition will be made.

Estimated cost of construction of the project is $530,000, of which $465,000 will be met by Iroquois. The commission was to open a hearing on the application late this week in Washington.

New Reports of Rangely Line Heard by Industry

DENVER. — A recurrence of previously published reports that Standard Oil Co. of California will build a crude line from Rangely to the West Coast brought a statement from company officials in San Francisco that the project is only under study.

A Denver newspaper carried a new account of the proposal, stating that the line—which would be the first pipe line link between the Rocky Mountain area and the Pacific Coast —is in the planning stage, that it will cost between $8,000,000 and $10,000,000 and that 10 pumping stations will be required.

A California Standard official pointed out the line has been under consideration for some time but no decision had been made on whether or when it might be built. The company controls about a half of the Rangely field, but Stanolind Pipe Line Co. handles transportation of the oil through its pipe-line outlets, moving crude either west to Salt Lake City or east to its main trunks.

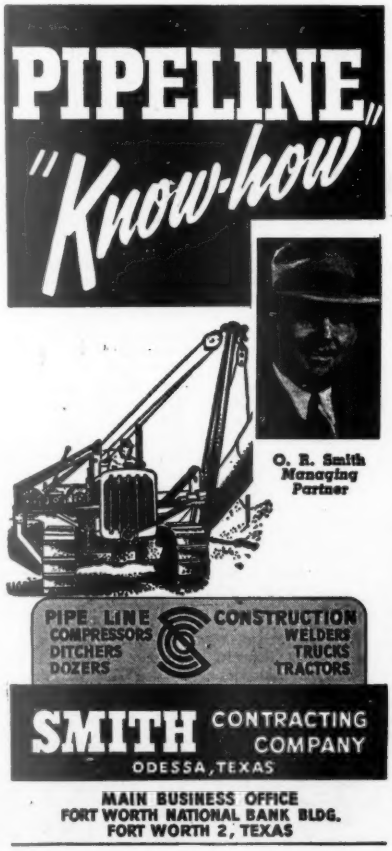
Hearing Set April 8 on Texas-Los Angeles Line

WASHINGTON. — Further testimony on the proposal of three companies to build a $40,000,000 pipe line from Texas gas fields to the Los Angeles area will be taken in Los Angeles April 8 by the Federal Power Commission.

First hearing on the project was held here last month. El Paso Natural Gas Co. is asking authority to construct a 1,000-mile 24 and 26-in. line from Moore County, Texas, to Blythe, Calif. Southern California Gas Co. and Southern Counties Gas Co., subsidiaries of Pacific Lighting Co., would build a 214-mile 26-in. line from Blythe to a point of connection with their Los Angeles system.

Pipe Line Tax Receipts Rise

WASHINGTON.—The federal Government netted nearly 25 per cent more revenue from its transportation of oil by pipe line tax in January than it did in the same month of 1945. Receipts from this source were $1,355,200.90 in January 1946 against $1,084,607.36 in January 1935. For the 7-month period ending January 31, however, receipts amounted to $9,054,910.04, a decline of $336,019.69 from the corresponding period in 1944-45.



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STATISTICS and

WEEKLY WELL COMPLETIONS . . . WEEK ENDED MARCH 16, 1946

	Total of all wells					Cum. to date		Wildcat completions and discoveries					Cumulative total, 1946				
	Comp.	Oil	Gas	Dry	Footage	1946	1945	Oil	Dist.	Gas	Dry	Total	Oil	Dist.	Gas	Dry	Total
New York	32	16	0	*16	54,700	322	268	0	0	0	0	0	0	0	0	0	0
Pennsylvania	73	38	2	†33	121,180	879	700	0	0	0	0	0	0	0	0	0	0
West Virginia	20	1	13	6	48,582	138	121	0	0	0	0	0	0	0	0	0	0
Ohio	21	3	11	7	57,812	218	147	0	0	0	2	2	1	0	5	10	16
Indiana	1	1	0	0	2,200	56	36	0	0	0	0	0	0	0	0	6	6
Kentucky	9	4	2	3	19,604	88	79	0	0	0	2	2	1	0	0	12	13
Illinois	38	26	0	12	89,528	391	347	2	0	0	5	7	9	0	0	67	76
Michigan	14	5	2	7	12,680	138	149	0	0	0	7	7	3	0	0	46	49
Kansas	53	34	6	13	164,793	433	291	1	0	0	6	7	5	0	1	51	57
Neb., Mo., Iowa	0	0	0	0	0	4	10	0	0	0	0	0	0	0	0	2	2
Oklahoma	56	30	3	‡23	191,384	508	481	2	0	2	8	12	16	0	9	69	94
Texas	135	84	6	45	606,555	1,544	1,450	4	2	0	20	26	28	3	5	227	263
North Central	52	30	0	22	132,690	532	405	2	0	0	7	9	10	0	0	79	89
West	10	7	0	3	65,201	311	377	0	0	0	3	3	7	0	0	39	46
Panhandle	6	3	2	1	17,395	78	119	0	0	0	0	0	0	0	0	2	2
Eastern	17	10	4	3	100,223	147	65	0	0	0	0	0	1	0	1	23	25
Gulf Coast	38	28	0	10	256,290	369	350	2	2	0	6	10	7	2	2	53	64
Southwest	12	6	0	6	34,756	107	134	0	0	0	4	4	3	1	2	31	37
Louisiana	22	11	3	8	135,859	262	184	0	1	0	3	4	13	2	1	29	45
Northern	11	5	3	3	42,669	130	57	0	0	0	2	2	2	0	0	17	19
Southern	11	6	0	5	93,190	132	127	0	1	0	1	2	11	2	1	12	26
Arkansas	3	1	0	2	7,069	37	27	0	0	0	1	1	2	0	0	6	8
Mississippi	7	4	0	3	41,243	50	68	0	0	0	3	3	1	0	0	13	14
Southeastern States	0	0	0	0	0	11	5	0	0	0	0	0	0	0	0	10	10
Montana	4	3	0	1	7,554	52	61	0	0	0	1	1	2	0	0	3	5
Wyoming	4	4	0	0	18,899	42	44	1	0	0	0	1	5	0	2	16	23
Colorado	2	2	0	0	12,657	21	7	0	0	0	0	0	1	0	0	3	4
New Mexico	8	6	0	2	29,053	82	101	0	0	0	0	0	1	0	0	7	8
California	39	31	0	8	202,032	372	490	0	0	0	6	6	3	0	2	43	48
Utah	0	0	0	0	0	2	1	0	0	0	0	0	1	0	0	1	2
Total United States	541	304	48	189	1,823,384	5,650	5,066	10	3	2	64	79	92	5	25	621	743
Total previous week	497	256	54	187	1,705,945	5,109	4,634	7	0	1	60	68	82	2	23	557	664
Total March 17, 1945	432	255	38	139	1,666,232	5,066	3,925	17	0	2	35	54	135	3	30	665	833

Service wells included: *16, †29, ‡1.

MARKET QUOTATIONS

(Quotations on other products than those shown here furnished on request. Quotations are f.o.b. plant in tank cars and in cents per gal. as of last Monday.)

REFINERY GASOLINE

Octane (A.S.T.M.)	78-80†	73-75
Mid-Continent*	5.625-6.00	5.00-5.25
Texas Gulf Coast	6.375	5.375-5.75
New York Area		7.425-7.90
California		6.00-6.875

*Basic Oklahoma Group 3. †1939 C.F.R. (research method).

NATURAL GASOLINE

Grades:	26-70	18-55
Oklahoma (Group 3)	2.750	3.300
N. Texas (f.o.b. plant)	2.250	2.700
N. Louisiana (f.o.b. plant)	2.625	3.150
California	4.875	5.500

CRUDE-OIL PRICES

Representative posted schedules per bbl.	
East Texas	$1.25
Conroe	1.43
Tepetate, Louisiana, avg. grav.	1.20
Illinois Basin	1.37
Pecos County, Texas	.95
Bradford, Pennsylvania	3.00
Van, Van Zandt County, Texas	1.08

Note: Exclusive of subsidy.

GRAVITY SCHEDULES

Top prices include all gravities above grades designated, and low prices include all gravities below grades designated:

Gravity—	Signal Hill, Calif.	Oklahoma, Kansas	Gulf Coast Texas	West Tex.*
18-18.9	$0.80			
19-19.9	.84		$1.06	$0.70
20-20.9	.88	$0.85	1.08	.72
21-21.9	.92	.87	1.10	.74
22-22.9	.96	.89	1.12	.76
23-23.9	1.00	.91	1.14	.78
24-24.9	1.03	.93	1.16	.80
25-25.9	1.07	.95	1.18	.82
26-26.9	1.11	.97	1.20	.84
27-27.9	1.15	.99	1.22	.86
28-28.9	1.18	1.01	1.24	.88
29-29.9	1.20	1.03	1.26	.90
30-30.9	1.23	1.05	1.28	.92
31-31.9		1.07	1.30	.94
32-32.9		1.09	1.32	.96
33-33.9		1.11	1.34	.98
34-34.9		1.13	1.36	1.00
35-35.9		1.15	1.38	1.02
36-36.9		1.17	1.40	1.04
37-37.9		1.19	1.42	1.06
38-38.9		1.21	1.44	1.08
39-39.9		1.23	1.46	1.10
40 and above		1.25	1.48	1.12

*Includes Lea County, New Mexico.

A.P.I. REFINERY REPORT

Week ended March 9, 1946
(Figures in thousands of barrels)

	Dly. crude runs to stills	Stocks: Gasoline	Distillate	Residual
East Coast	776	23,439	7,247	5,976
Appalachian	151	4,130	466	590
Ill., Ind., Ky.	722	24,157	3,086	3,192
Okla., Kan., Mo.	376	9,859	1,359	1,028
Inland Texas	196	3,175	298	592
Tex. Gulf Cst.	1,150	15,289	4,258	4,240
La. Gulf Cst.	311	4,673	1,373	1,185
N. La., Ark.	61	2,060	443	222
Rocky Mtn.	123	2,420	406	592
California	790	15,679	6,195	20,771
Total 3- 9-46	4,656	104,901	25,131	38,388
Total 3- 2-46	4,779	104,462	25,148	38,441
Total 3-10-45	4,775	97,175	26,191	43,907

CRUDE-OIL STOCKS

(Bureau of Mines Estimate)

Week ended:	Bbl. of crude*
March 9, 1946	226,112,000
March 2, 1946	229,430,000
March 10, 1945	218,760,000

*Excludes unrefinable Calif. stocks.

TRENDS

DAILY AVERAGE PRODUCTION FOR WEEK

	Mar. 16 crude oil	Bureau of Mines March demand	Mar. 9 crude oil
Alabama	1,000	500	1,000
Arkansas	77,050	76,000	77,350
California	847,750	838,000	835,750
Colorado	22,340	23,000	22,990
Eastern	63,900	61,200	66,750
Florida	100	100	100
Illinois	206,300	198,000	207,500
Indiana	17,850	13,000	18,700
Kansas	252,750	252,000	244,650
Kentucky	32,100	29,000	30,550
Louisiana	375,900	372,000	375,700
North Louisiana	82,550	.....	82,350
South Louisiana	293,350	.....	293,350
Michigan	43,250	46,000	45,100
Mississippi	55,100	52,000	55,300
Montana	23,440	20,400	21,670
Nebraska	800	800	850
New Mexico	95,150	98,000	95,150
Oklahoma	371,500	366,000	381,550
Texas	1,817,450	1,910,000	1,817,450
East Texas	317,400	.....	317,400
East Central Texas	127,500	.....	127,500
North Central Texas	146,050	.....	146,050
Texas Panhandle	81,000	.....	81,000
West Texas	436,500	.....	436,500
Southwest Texas	290,200	.....	290,200
Texas Gulf Coast	418,800	.....	418,800
Wyoming	100,600	94,000	91,200
Total United States	4,404,330	4,450,000	4,389,310
Change from previous week	up 15,020		

Total production January 1-March 16 ..... 352,968,070 bbl.
Same period last year ..... 355,560,650 bbl.

CRUDE-OIL STOCKS 226,112,000 bbl. as of March 9—down 3,318,000 bbl. One year ago 218,760,000 bbl.

GASOLINE STOCKS 104,901,000 bbl. as of March 9—up 439,000 bbl. One year ago 97,175,000 bbl.

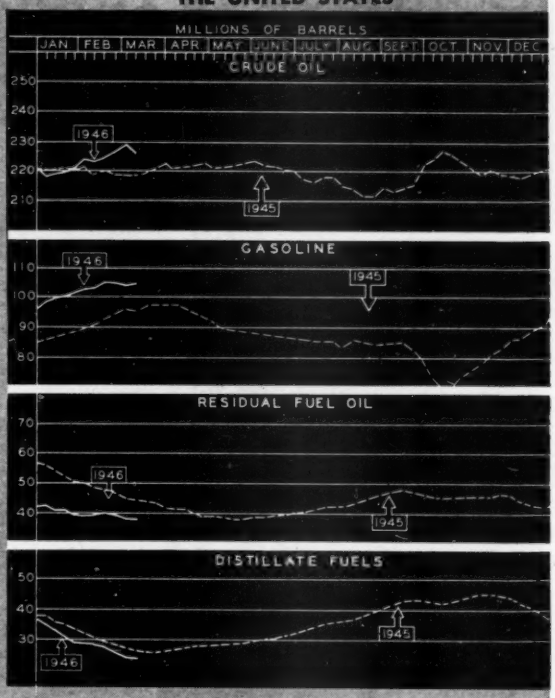
RESIDUAL FUEL-OIL STOCKS 38,388,000 bbl. as of March 9—down 53,000 bbl. One year ago 43,907,000 bbl.

GAS OIL AND DISTILLATE STOCKS 25,131,000 bbl. as of March 9—down 17,000 bbl. One year ago 26,191,000 bbl.

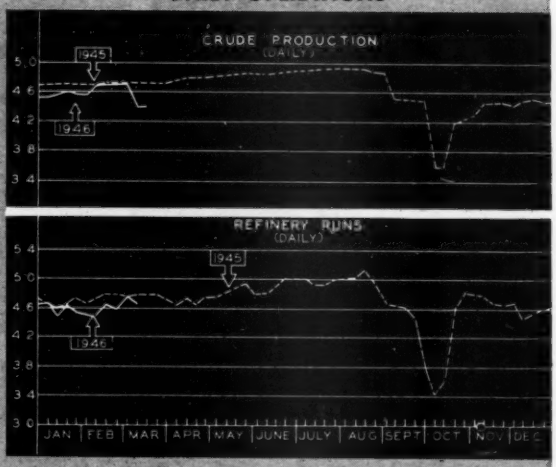
CRUDE-OIL PRODUCTION 4,404,330 bbl. as of March 16—up 15,020 bbl. One year ago 4,763,700 bbl.

REFINERY RUNS 4,656,000 bbl. daily week ended March 9—down 123,000 bbl. One year ago 4,755,000 bbl

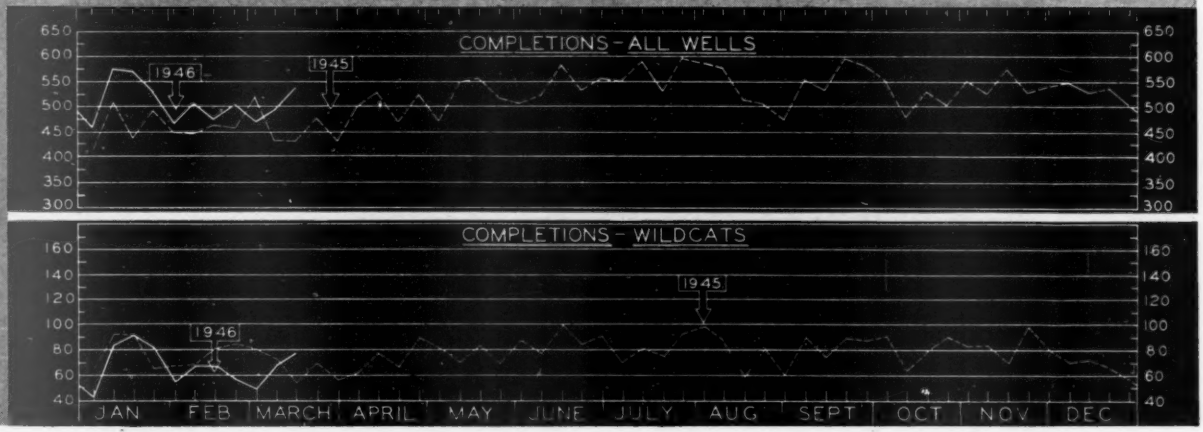
OIL STOCKS IN THE UNITED STATES



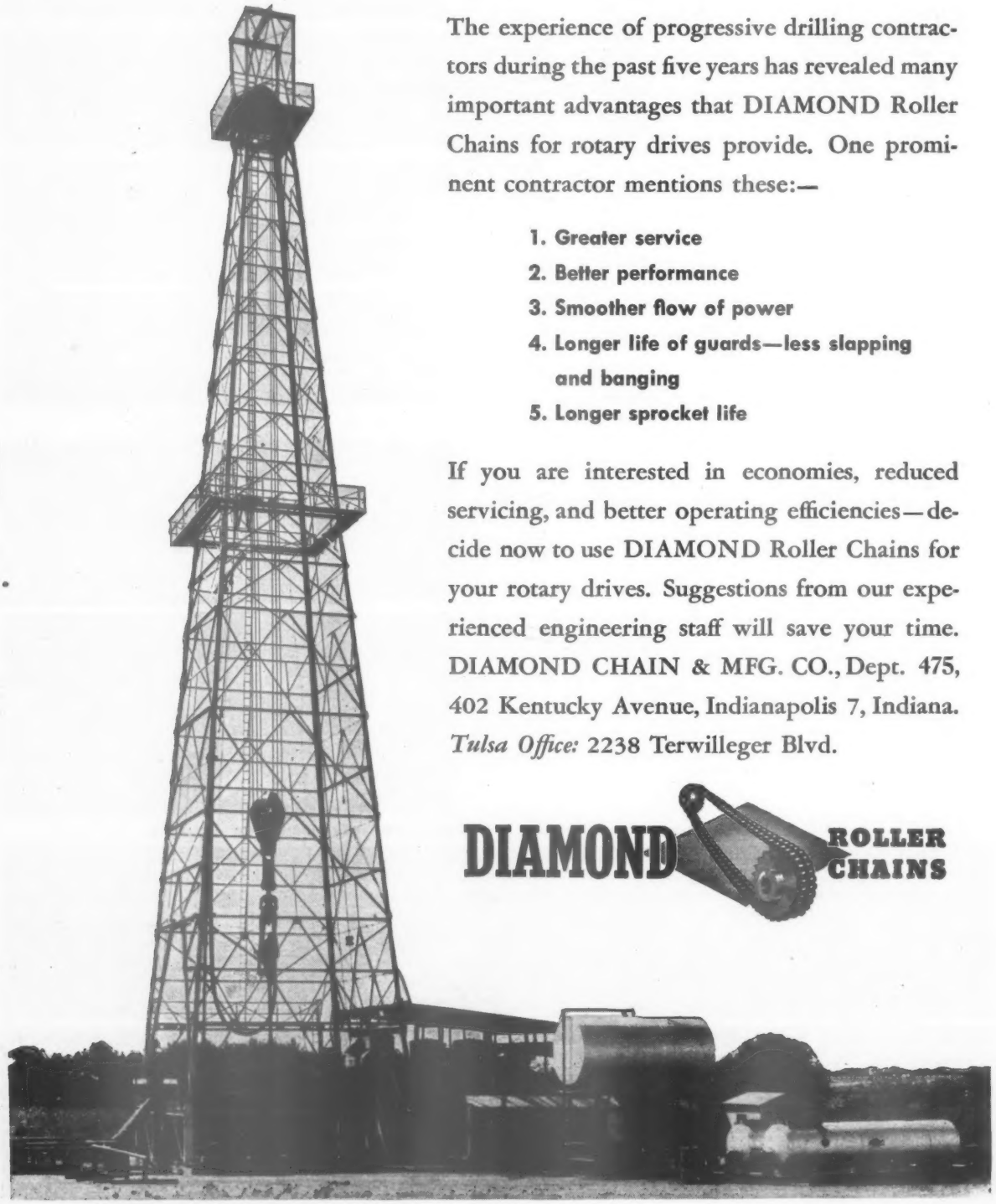
DAILY OPERATIONS



Solid line charts weekly completions, service wells in Eastern area included



Contractors Report Greater Service With DIAMOND Chain Rotary Drives



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Exploration and Drilling

Plugback Test Draws Interest

AN unusual happening in an old well is sometimes just as interesting as the results of an ordinary wildcat; occasionally even more interesting. When this occurs, somewhere in the background there is usually a geological problem, or speculation, which, if ever solved or proven true, might mean the opening up of an important oil field, or even a trend of fields.

This accounts for the interest among some geologists in the unusual performance of Sinclair Prairie Oil Co. 1 Oldfather, C SE 7-31s-14w, an edge well in the Skinner Ranch area, Barber County, Kansas. Originally completed in January 1945 in the Arbuckle lime for about 200 bbl. of oil and 75 bbl. of water, the well had declined until it was decided to plug back. When plugged back to the Simpson and perforated, the well filled up in 30 minutes, then flowed 40 bbl. of oil in the next 30 minutes, before being shut in for tankage and erection of a separator and flow lines.

The Arbuckle has produced a little oil in this general area, and there have been at least two other Simpson wells to the east, Pryor & Lockhart A-2 Gant, SW SW SE 7-31s-13w; and same company's C-2 Gant, C/NL NE 18-31s-13w. The Maquoketa-Viola (?) has produced rather large gas wells, and the Viola has also produced some oil. In some places in the area, the Simpson has been tested and carried water. Then why bother about what may be a small local accumulation of Simpson oil?

The reason is that while the Simpson is shaly and probably spotted in the area that has been tested so far, it is only about 6 miles north of the place where the Simpson is completely cut out of the section. Many geologists have figured for a long time that as the section dipped off the Central Kansas Uplift toward the Anadarko Basin, and thickened, there ought to be a critical place where there would be enough Mississippian cover to give good possibilities of Simpson production.

Logically one of the best places to shoot for Simpson production (which is here getting close to the part of Oklahoma where Simpson and Wilcox sands are always associated in the minds of oil men) is in local highs on regional highs, near the place where it wedges out. If porosity is present, the chances ought to be good.

In this Barber County area, the Viola lime, which is the top or just on top of, the Simpson section, looks regionally high; some oil and much gas have been found, indicating a general petroliferous environment; and the Simpson is close to the wedge-out point. Furthermore, it is in line with a cross trend of oil and gas pools off the Central Kansas Uplift.

Therefore some geologists reason that if they can find the right combination of sand and structural conditions in this area, with adequate Mississippian cover, they might find a big Simpson field.

Obviously finding the right combination has not been a simple problem for there is an areal cluster of about five small pools, Turkey Creek (oil); Sun City (oil); Marjorie (gas, with some oil); Lake City (oil); and Skinner (oil and gas), none of which looks like a big field. But some geologists will keep on hoping, and the Sinclair Prairie plug-back results give more hope, for the moment at least.

MICHIGAN

State's Potential Up 12,680 Bbl.

SAGINAW.—Michigan potential increased 12,680 bbl. a day with five new producers in the past week while field operations also resulted in seven dry holes and two gas wells and the lull in new activity continued as the number of new locations was but seven.

New wells in Arenac's Deep River field came in for 300 and 180 bbl. per hour and another in Sherman of Isabella—the Coldwater field—flowed 40 bbl. per hour. Smaller producers were completed in Lyon of Roscommon and Douglass of Montcalm. Another Deep River test in Section 23 near the 300-bbl. well was a dry hole. Five of the seven dry holes were wildcat tests.

The new locations are in Section 5, Lincoln Township, Osceola County; Section 6, Crystal, Montcalm; Section 4, Colfax, Mecosta; Section 1, Baldwin, Iosco; Section 11, Edenville, Midland; Section 11, Norwich, Missaukee; Section 8, Deep River, Arenac.

Michigan Oil & Gas Association directors, meeting here Friday, announced headquarters will be moved April 1 from Grand Rapids, back to Mt. Pleasant for more central location.

MICHIGAN WILDCAT FAILURES

Kalamazoo County, Alamo Township: W. D. Gannett 1 Kirk Deal, SW SW SW 29-1s-12w, dry in Traverse limestone, TD 1,310 ft.

Montcalm County, Cato Township: C. E. Weller 1 Failing-Behrenwald, NE SE SW 27-12n-8w, dry in Dundee, TD 3,534 ft.

Muskegon County, Muskegon Township, Albert Maring 1 William Evans, SE NE SW 23-10n-16w, dry in Traverse limestone, TD 1,755 ft.

Ottawa County, Jamestown Township: Clawson Development Co. 1 Hoeve & Van Koevering, C SE SE 30-5n-13w, dry in Berea, TD 928 ft.

Saginaw County, Jonesfield Township: Cities Service Oil Co. 1 J. V. McNier, SE SE SE 11-12n-1e, dry in Monroe, TD 3,422 ft.

CANADIAN FIELDS

Shallow Sands Produce In Turner Valley Test

CHATHAM. — In North - Central Turner Valley, Okalta Oils 22, LSD 8, 1-20-3w5, finished at 4,508 ft. as a test of light crude horizons above the lime, is taking production from the Dalhousie, Home, Stockmen's and McDougal-Segur sands, with main production from the latter. The well is pumping 24 bbl.

First of a series of offset tests in Turner Valley, Continental Oil 1, LSD 8, 4-21-3w5, in the North Extension area, got Madison contact at 7,918 ft. and is deepening in the lime after setting production string. Five other Turner Valley tests are drilling.

Manyberries.—Centering in the town of Manyberries in southeastern Alberta, with its northern limits 25 miles south of Medicine Hat, a reservation of 198,720 acres has been secured by California-Standard Oil Co. for new development. The area is southwest of the Cypress Hills structure, tested by the Eagle Butte Co. in 1928, and has seen practically no development work. In recent years California-Standard has been active in the southern Alberta plains area, and was primarily responsible for most of the development in the Conrad field.

Pinhorn Dome.—In the southwestern section of the Alberta plains area, Union Oil Co. of California, entering the Alberta field for the first time, is undertaking joint development with McColl-Frontenac Oil Co. of a 200,000-acre reservation near the Pinhorn Dome and close to the Montana boundary. Two wells drilled by McColl-Frontenac in 1944 showed good gas production. The two companies have a joint program of four wells, the first to start this spring.

Kinsella.—In the Kinsella field, eastern Alberta, Imperial-Kinsella 6, LSD 10, 11-47-9w4, finished at 2,039 ft. with 5,500,000 cu. ft. gas, extending production to the south.

Keystone Valley.—On the Keystone Valley structure, in the foothills northwest of Turner Valley, Roxana 3-K, LSD 7, 31-27-6w5, faulted from lower to upper Benton at 2,860 ft., but has got a gas flow in a recurrence of the Cardium sandstone at 3,100 ft. The Cardium, a recognized marker in Turner Valley, has never shown gas in that field.

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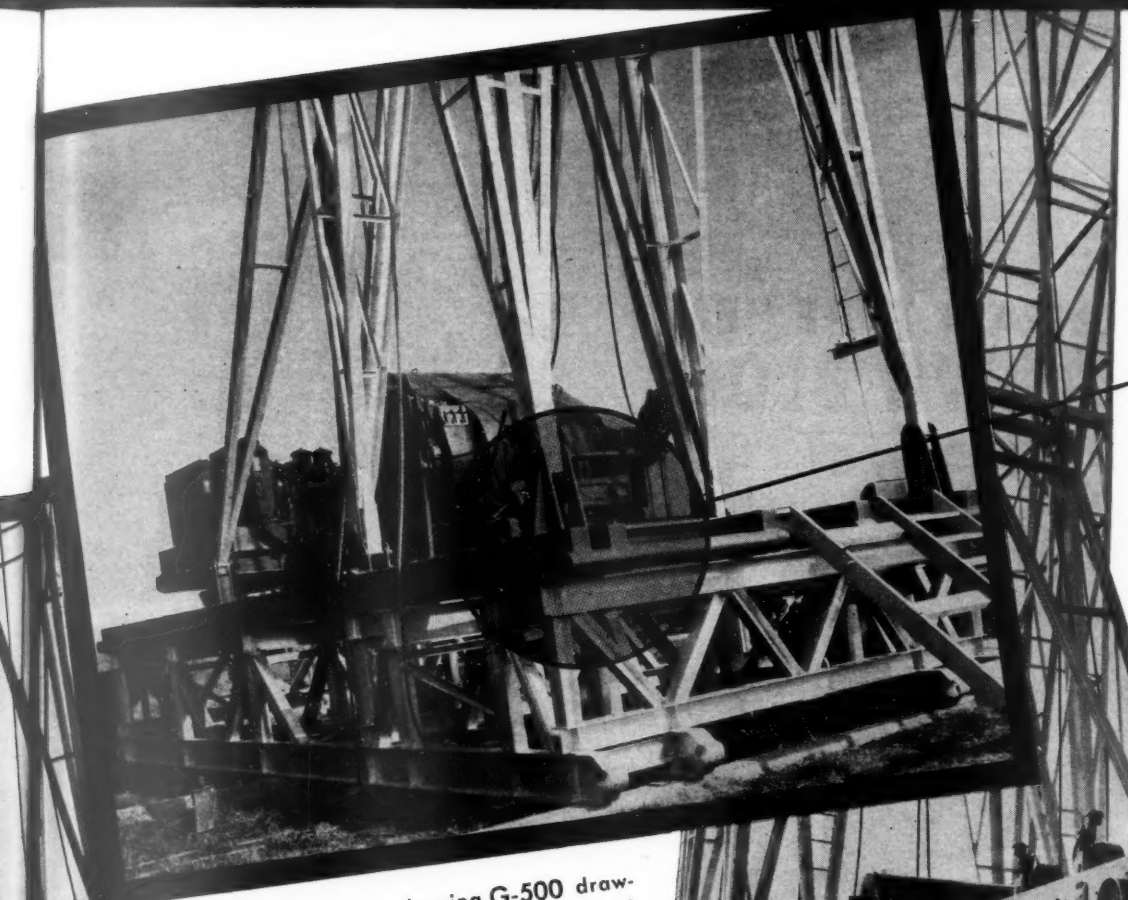
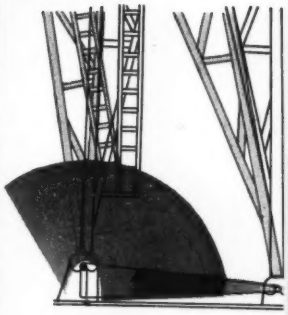


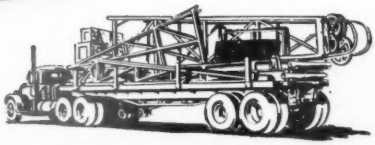


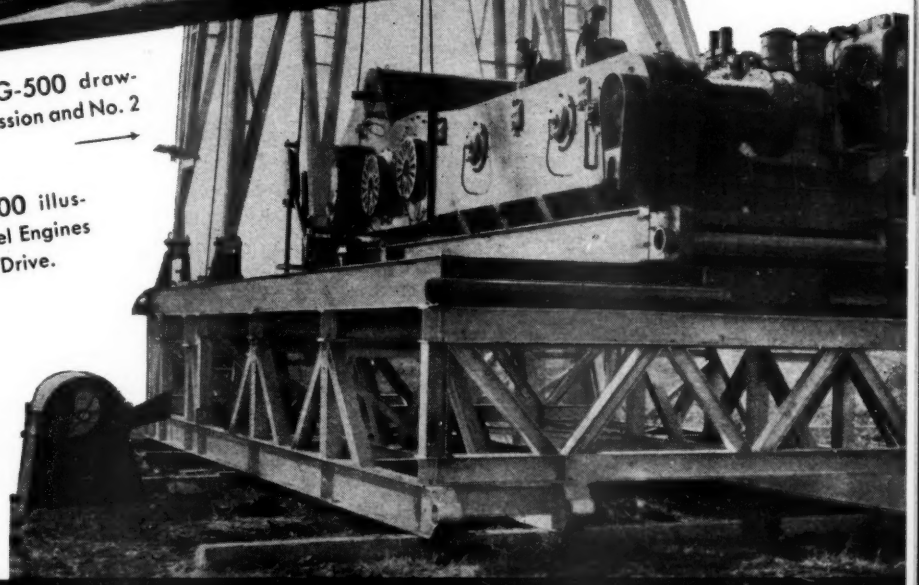
NO SNUB LINE NECESSARY

Dual Pivot feature permits er operation of raising mast tc accomplished with line in sion. Unique design elimin mast falling over center as it proaches its working posit *A Snubbing Line is not neec*

Right: Side view showing G-500 draw-works, Compounding Transmission and No. 2 Engine. →

Left: Side and rear view of G-500 illustrating G-M Series 71 Twin 6 Diesel Engines and Fawick Air-Flex Clutch Pump Drive. ←





CONTINENTAL

PERMIAN BASIN

Second Devonian Producer Recorded for Andrews

MIDLAND.—Gulf Oil Corp. 1-Z University, Section 43, Block 13, University Lands, is the second Devonian producer in the northwestern Andrews County area opened by Mid-Continent Petroleum Corp. 1-15 University south of the Fullerton 8,500-ft. (Devonian) field. On a 1-hour drill-stem test from 8,470-8,545 ft. it flowed 43 bbl. of oil in 1 hour. On another 1-hour drill-stem test from 8,545-630 ft. it flowed 30 bbl. in 1 hour. Casing was being run to 8,495 ft. for completion at 8,630 ft. Oil flows also were developed on drill-stem tests of two sections of the lower Permian, but the well will be completed at this time only from the Devonian. The well is ¼ mile east of the Mid-Continent discovery. Atlantic Refining Co. 1-A University, Section 1, Block 11, University lands, deep test in the shallow West Andrews pool of southern Andrews County, was drilling below 8,595 ft. in Simpson lime.

Texas Pacific Coal & Oil Co. 1 Brown & Altman, Section 25, Block B-5, Public School Land Survey, Holt discovery on the west side of the Emperor Deep pool of Winkler County, has been completed for a 24-hour official flow of 265 bbl. of 40.1°-gravity oil. The oil was cut only 0.2 per cent by basic sediment and water. Gas-oil ratio was 800 to 1. The gage was through a 5/16-in. choke. Production is through perforations from 4,765-810 ft. Cascade Petroleum Corp. 1 McLaurin, Section 52, Block M, ELRR Survey, ½-mile east outpost to the Welch pool of Dawson County, pumped 115 bbl. of oil in 24 hours through 2-in. tubing at 4,913 ft. Gravity was 32°.

Stanolind Oil & Gas Co. and Landreth Production Co. 3-Q Scharbauer, Section 9. Block B-25, Public School Land, discovery producer from the Tubb zone of the Clear Fork at the north end of the Goldsmith field in northwestern Ector County, flowed 85 bbl. of oil in 28 hours. The oil was cut 2 per cent by b.s and w. Testing continued through perforations from 6,090-185 ft. and 6,200-90 ft. Stanolind 1 Kayser, scheduled Ellenburger test in Section 34, Block 34, T-2-S, T&P Survey, 1½ miles west of the South Cowden (Grayburg) field, Ector County, had reached 11,096 ft. in black shale. Phillips Petroleum Co. 1 Eidson, Section 9, Block B-16, Public School Land, wildcat 1 mile west of the north end of the Penwell (San Andres) pool, Ector County, was drilling below 7,800 ft. in the Silurian.

Amerada Petroleum Corp. 1-C Jones, Section 2, Block A-6, Public School Land, ¾-mile southeast outpost to the Jones Ranch pool of extreme northwestern Gaines County, cored 33 in. of Devonian lime with slight porosity and oil staining from 11,198-205 ft. Another core from 11,205-214 ft. recovered 4 ft. of Devonian lime bleeding oil. Operator was preparing to core deeper.

Keystone-Ellenburger field, Winkler County, reported three completions this week and Keystone-Holt and Keystone-Colby fields, Winkler County, and Fullerton field, Andrews County two each. The Fullerton field had three locations and Welch field two. The TXL field, Ector County, has 39 drilling wells; Keystone-Ellenburger field 34; Fullerton field 26; Block 31 field, Crane County, 23, and Welch field, Dawson County, 14.

SUCCESSFUL WILDCATS IN SOUTHWEST TEXAS

Bee County: Gas-condensate discovery, Strauch-Wilcox pool—Mills Bennett 1 Martha Berger et al, J. M. Uranga Grant, 2 mi. SW of Tuleta, TD 8,890 ft., top sand 8,082 ft. (Luling sand), perf. 464 holes 8,082-8,140 ft., PT 192 bbl. condensate per day through ¼-in. choke, and 6,000,000 cu. ft. gas per day, TP 3,800 lb., CP 4,000 lb., no water.

Karnes County: New oil pay, Falls City field—Southern Minerals Corp. 4 L. A. Faires, Louis Manchaca Grant, TD 5,002 ft., perf. 60 holes 4,887-4,895 ft., PT 20 bbl. per day through a 9/64-in. choke, no gas, TP 25 lb., casing sealed, gravity 48°, no water.

WILDCAT FAILURES COMPLETED IN WEST TEXAS

Gaines County: Fred M. Manning 1 Sloan, Sec. 54, Blk. AX, PSL Survey, SW outpost Wasson "66" and "72" pool, elev. 3,561 ft., San Andres 4,470 ft., dry, TD 6,870 ft.

Garza County: Great Western Prod. 1 Cliff Johnson, Sec. 4, A-555, 2 mi. N PHD pool, elev. 2,987 ft., San Andres 2,970 ft., dry, TD 3,800 ft.

Pecos County: Bryce McCandless 1-111 Atlantic Refg., Sec. 111, Blk. 11, H&GN Sur., 1 mi. NW Owego, Ellenburger 4,175 ft., dry, TD 4,522 ft.

SOUTHEASTERN NEW MEXICO

HOBBS.—Humble Oil & Refining Co. 1 R. E. Hardison, 34-21s-37e, 2 miles northwest of the Paddock field in southeastern Lea County, ran a 90-minute drill-stem test from 5,090-124 ft. and recovered 120 ft. of oil and gas-cut drilling mud. Operator was coring ahead. Humble 1-B Federal-Leonard, 12-26s-37e, ½ mile north of 1 Federal-Leonard, first Ellenburger producer in the state and opener of the Dublin pool, made a 1-hour drill-stem test from 9,655-81 ft. Recovery was 1,700 ft. of gas and salt-cut drilling mud. It was drilling below 9,825 ft. in lime and shale. Lion Oil Co. 1 Wylie, 5-23s-38e, ½ mile east of the southeast side of the Drinkard field, recovered 60 ft. of mud with no shows on a 75-minute drill-stem test of the Devonian from 7,430-545 ft. McKee was topped at 8,041 ft. Elevation is 3,389 ft. It was drilling below 8,119 ft. in lime.

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Paddock field, Lea County, reported two completions this week, Forest field, Eddy County, and Brunson field, Lea County, one each. Caprock field, Chaves and Lea counties, had two locations, and Forest and Burton fields, Eddy County, and Paddock and Drinkard fields, Lea County, each one. Drinkard field has seven drilling wells; Grayburg-Jackson field, Eddy County, has six, and Penrose-Skelly and Paddock fields, Lea County, each has five.

SOUTHWEST TEXAS

New Pay Opened at Falls City Field

CORPUS CHRISTI.—New oil pay at Falls City field, Karnes County, has been opened by Southern Minerals Corp. 4 L. A. Faires. Drilled to a total depth of 5,003 ft. with 7-in. casing at 4,901 ft., the well failed to produce in the regular 5,000-ft. pay. Operators perforated the new pay zone from 4,887-4,895 ft. and it flowed 20 bbl. per day through a 9/64-in. choke, no gas, tubing pressure 25 lb., 48° gravity oil, no water.

Mills Bennett 1 Martha Berger et al, discovery well of the Strauch-Wilcox field, Bee County, J. M. Uranga Grant, 2 miles southwest of Tuleta, on potential gage, flowed 192 bbl. of condensate per day through a ¼-in. choke and 6,000,000 cu. ft. gas per day, tubing pressure 3,800 lb., casing pressure 4,000 lb., no water. Total depth is 8,890 ft., and production is from the Luling sand perforated with 464 holes from 8,082-8,140 ft.

In Gonzales County, 5 miles southeast of Waelder, Amerada Petroleum Co. 1 Henderson et al unit ran tubing and swabbed a little mud and gas, no oil. Total depth is 8,778 ft. in Edwards lime. The 7-in. casing is set on the top of Edwards at 8,770 ft. and operators are preparing to drill deeper. On drill-stem test made previous to setting of pipe, at 8,760-78, ft. had recovered some mud cut with oil and gas, although the tool leaked and no accurate test was possible.

Quintana Petroleum Co. 1 Spahn, 4 miles northwest of Gonzales in Gonzales County, had some trouble with a hung packer in the 5-in. liner but recovered the fish and cemented for further testing up the hole. Total depth is 10,845 ft. in the Smackover lime. Several tests have been made near the bottom of the hole, but no commercial production as yet.

Magnolia Petroleum Co. has staked two new locations as outposts to the LaGloria field. The 1 T. S. Proctor, about a mile southeast of LaGloria field production, on the Brooks County side of the line, in Lot 5, Block 1, Faifurrias Farm and Garden tracts, is scheduled to drill to a depth of 10,500 ft. and explore deep flank sands. The 1 Townsite Unit, scheduled to 10,000 ft., is approximately ½ mile east of production, and on the Jim Wells County side of the line. It is in Lot 3, Block 6, subdivision of lands adjoining townsite of LaGloria. The current wildcat being drilled by Magnolia is 2 miles east of LaGloria field, 1½ miles south of the Blucher field and 1¼ miles northwest of Wilson field, in Lot 10, Block 12, subdivision of lands adjoining townsite of LaGloria. It is also scheduled to go as deep as 10,000 ft.

There were 47 new locations reported this week, 7 being wildcats, 1 each in Bastrop, Guadalupe, Medina, Val Verde, Webb, Zapata, and Zavala counties. One new pay in Karnes County, Falls City field, and one gas-condensate discovery in Bee County, were included in the 36 completions reported. Bexar, Duval, Starr, Travis counties received 1 dry wildcat each, with Live Oak County receiving 2.

WILDCAT FAILURES IN SOUTHWEST TEXAS

Bexar County: Ernest J. Biskamp 1 State of Texas, San Antonio State Hospital Lands, dry in Lower Taylor, TD 1,507 ft.

Duval County: Cox & Hamon 1 Albert Martin, Los Angeles De Ariba Grant, 4 mi. SE of Bruni, dry, TD 2,833 ft.

Live Oak County: Bridwell Oil Co. 1 R. W. Duncan, Live Oak County School Land Sur., Abst. 272, 5 mi. NW of LaGarto, dry, TD 4,616 ft.

H. E. Dirks et al 1 Mrs. E. T. Turner, B. B. Atkins Sur., ½ mi. W of Cadiz, dry, TD 4,256 ft.

Starr County: F. W. Dooley, Tr., 1 L. Canalas, La Sacatosa Grant, 10 mi. NW of El Sauz, dry, TD 1,436 ft.

Travis County: S. M. Messer and W. J. Riley 1 A. Garcia, Jose Navarro Grant, 15 mi. E of Austin, dry, TD 1,310 ft. Austin chalk.

SOUTH LOUISIANA

Humble Gets Good Producer In New Iberia Field

NEW ORLEANS.—An excellent producer from a new sand in New Iberia field of Iberia Parish has been completed by Humble Oil & Refining Co. The 2 Mayo Romero, 49-12s-7e, north of the 1 Mayo Romero which discovered deep gas and condensate production, flowed at the rate of better than 1,000 bbl. of oil daily, gaging 259 bbl. of 32-gravity oil in 24 hours through a ⅛-in. choke with 1,400 lb. flowing pressure on the tubing, casing sealed, and a gas-oil ratio of 610 to 1. Production is through 24 perforations from 9,683-87 ft. Total depth is 9,844 ft. and 7-in. casing is cemented at 9,735 ft.

Humble 1 Louisiana Delta Farms Co., prospective field opener in the Little Temple area of LaFourche Parish, 19-17s-23e, is preparing to make another attempt successfully to complete, after conducting squeeze jobs from 10,576-70 ft. and 10,587-91 ft. Last test through 32 perforations at 10,587-91 ft. flowed 18 bbl. of fluid in 3 hours through a ½-in. choke with 3,000 lb. tubing pressure and a gas-oil ratio of 13,000 to 1. It was showing 52 per cent salt water.

Sun Oil Co. 1 Rice Land & Lumber Corp., deep wildcat test in the Singer area of Beauregard Parish, 32-4s-11w, is making a new test for production through perforations at 11,954-964 ft. Three previous tests failed to show for production. Total depth is 12,662 ft. and 7-in. casing is cemented on bottom.

Continental Oil Co. and Sohio Petroleum Co. 1 Cameron Parish School Board, wildcat test in the Johnson's Bayou area of Cameron Parish, 16-15s-14w, cored sand and sandy shale showing gas from 9,008-22 ft. Operators are coring ahead in sandy shale from 9,087 ft.

All locations reported this week are in proven areas. Acadia Parish received three locations while Jefferson Davis Parish received two, and LaFourche Parish only one. Of the 11 completions 2 are wildcats, 1 a new pool discovery in St. James Parish, and 1 a dry hole in St. Landry Parish.

SUCCESSFUL WILDCAT IN SOUTH LOUISIANA

St. James Parish: New condensate pool—Humble Oil & Refg. Co. 1 Society of Catholic Religeous Education & Literature, 25-12s-4e, College Point area, total depth 10,765 ft., top sand 10,705 ft., perf. 320 holes 10,719-42 ft., PT 129 bbl. per day through a ¼-in. choke, gas-oil ratio 38,346 to 1, tubing pressure 3,300 lb., gravity 54°, trace of water.

WILDCAT FAILURE IN SOUTH LOUISIANA

St. Landry Parish: Crosby Drilling Corp. and Lyle Cummins 1 Eugene Gordon, Woodside area, 2-3s-6e, dry, TD 11,735

TEXAS GULF COAST

South Mayes Discovery Is Completed

HOUSTON.—Humble Oil & Refining Co. 1 Lula Wallis et al, discovery well for South Mayes field of Chambers County, 6,500 ft. southeast of Mayes field production, in the Samuel Mather Survey, Abstract 192, has been completed for a potential flow of 185 bbl. of 36°-gravity oil through a 3/16-in. choke, having 3,175 lb. flowing pressure on the tubing and a high gas-oil ratio of 10,530 to 1. Production is through 23 perforations at 9,194-9,138 ft., which is a thousand feet deeper than producing levels in the Mayes field to the northwest. Total depth is 10,010 ft., and 5½-in. casing is cemented to 9,995 ft., with top of cement plug at 9,206 ft.

Also in the Mayes field southeast extension area, Randolph C. Reed has applied for a permit to drill a 10,000-ft. exploration test. It is 1 Mrs. Effie Pyle et al, located on a 149.5-acre lease in the E. H. R. Wallis Survey, Section 366, Block 20, approximately 2,100 ft. northeast of Humble 1 Wallis well which is 6,500 ft. southeast of Mayes field production of Chambers County.

Magnolia Petroleum Co. 2 Bolton, new field opener in Trinity County, 3 miles west of Glendale in Henry Bond League, has been officially completed for a gage of 24 bbl. of condensate, and 5,000,000 cu. ft. of gas daily through a 10/64-in. choke with tubing pressure 4,229 lb. flowing, and 4,380 lb. shut-in pressure. It has an estimated 37,000,000 cu. ft. of gas flow, open. Production is from the Edwards lime through 240 perforations at 10,500-540 ft.

Texas Gulf Producing Co. 1 Earline Landig, James Cummins Survey, 5,750 ft. northeast of the discovery for the Columbus pool of Colorado County, is making a flow test through the drill stem after perforating 250 holes from 8,464-8,528 ft. On a previous test in perforations 8,736-8,742 ft. the well showed gas, condensate and salt water and operators squeezed perforations. Total depth is 8,864 ft., with 5½-in. casing cemented to 8,861 ft.

Humble 10 Edward F. Milo et al, Wilcox test at Tomball field in Harris County, has been killed after it started making dry gas, and further tests will be made. Last week the well flowed 14 bbl. of condensate daily through a ⅜-in. regulator choke along with 1,750,000 cu. ft. of gas through 120 perforations at 8,820-40 ft. Well was killed and perforations are being squeezed for further tests after pressure on the tubing increased to 2,150 lb., and the well gaged 1,330,000 cu. ft. of dry gas.

Erwin Millner 1 S. H. Reid, wildcat test in the Hillister area of Tyler County, Emily Sanderson Survey, is dry with no shows encountered after coring from 6,981-7,125 ft. Only sandy shale was recovered, no shows. An electrical log was run to 7,630 ft., total depth.

Skelly Oil Co. 1 Annie L. Boeker, ¼ mile southwest of the 1 Hamel discovery well of Hamel field, Colorado County, is dry. This test is in the Richard Dowdy Survey, and was drilled to a total depth of 10,158 ft.; no shows were recovered in sidewall samples.

In the Provident City area of Lavaca County, Shell Oil Co., Inc., has staked 2 Alma V. Traylor as a new deep test to the Wilcox zone. It scales 2,200 ft. from northwest line and 600 ft. from southwest line of the HE&WTRR Survey 5. It will be drilled to approximately 8,800 ft.

Phillips Petroleum Co. located two new 9,850-ft. tests at Chocolate Bayou in Brazoria County. They are the 3 Bernard Unit 21 and the 2 S. F. Benson (Smiley) Unit 3. The latter being a twin test 164 ft. southwest of the No. 1 well, and the former being located 1,412 ft. northwest of the No. 2 test.

Sixteen lew locations were reported this

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WICHITA FALLS, TEXAS

week with Wharton County receiving the greatest activity with three wildcats and one pool test. Chambers and Grimes counties each received one wildcat test. Of the 14 completions 6 are wildcats, 2 pool openers, and 4 dry holes. Liberty and Trinity counties each received a new pool, with Brazoria, Fort Bend, Harris, and Tyler counties each receiving one dry wildcat.

SUCCESSFUL WILDCATS IN UPPER GULF COAST

Liberty County: McCoy field discovery—The Ohio Oil Co. 1 Kirby Lumber Corp., James McCoy League, 6 mi. E of Cleveland, TD 10,285 ft., top sand 9,107 ft., perf. 63 holes 9,106-27 ft., PT 51 bbl. condensate per day and 1,167,000 cu. ft. gas through 3/8-in. choke, 78,000,000 cu. ft. gas open flow, TP 2,910 lb., CP 3,210 lb., shut in TP 3,265 lb., gravity 54°, 18 per cent salt water.

Trinity County: New condensate pool—Magnolia Pet. Co. 2 Bolton, Henry Bond League, Abst. 75, 3 mi. W of Glendale, TD 12,505 ft., top Edwards lime 10,490 ft., perf. 240 holes 10,500-540 ft., PT 24 bbl. condensate and 500,000 cu. ft. gas through 10/64-in. choke, estimated 37,000,000 cu. ft. gas open flow, TP 4,229 lb., shut in TP 4,380 lb., gravity 51°, no water, TD 12,505 ft.

WILDCAT FAILURES IN UPPER GULF COAST

Brazoria County: General Crude Oil Co. 6 Belle H. Wisdom, in Damon Mound area, Abraham Darst Sur., Blk. 109, dry, TD 6,314 ft.

Fort Bend County: Stewarts et al 1 A. P. George, A. D. Kelker Sur., 4 mi. SW of Crabbe townsite, Smithers Lake area, dry, TD 8,303 ft.

Harris County: Jack W. Frazier 1 Hall's Bayou Realty Corp. et al, Joseph Callihan Sur., 1½ mi. SE of Mt. Houston townsite, dry, TD 4,630 ft.

Tyler County: Erwin Millner 1 S. H. Reid, Emily Sanderson Sur., 3¾ mi. W of Hillister townsite, dry, TD 7,630 ft.

N. CENTRAL TEXAS

New Pool Opened In Western Montague

WICHITA FALLS.—Youngblood & Foree 2 Joe Benton, A. Lewis Survey, has opened a new pool 3 miles northwest of Stoneburg in western Montague County. Caddo was topped at 6,058 ft. On a drill-stem test from 6,137-45 ft. there was gas in 2½ minutes and the well began flowing oil in 20 minutes. Operator is pulling testing tool. Bridwell Oil Co. and Bruce Sullivan 1 McCall and Fooshee, E. I. M. Williams Survey, wildcat north of Montague in Montague County, is dry at 6,555 ft. in the Bend conglomerate. The test had showings of oil in the conglomerate, but the survey apparently did not indicate commercial production. S. D. Johnson 1 Claude Willis, S. Carey Survey, wildcat 2 miles north of Forrestburg, Montague County, perforated casing with 108 shots from 7,286-304 ft. in the Marble Falls. A rainbow show of oil was swabbed and 3,200 ft. of salt water.

Grace & Grace 1 Edwards, Block 16, G. C. Bruner Survey, wildcat east of the Coleman pool, Archer County, topped the Caddo at 5,215 ft. Sandy lime showing oil was logged from 5,070-94 ft. A drill-stem test of the section recovered 1,700 ft. of free oil with 1 bbl. of salty water. When perforations from 5,490-95 ft. were being squeezed casing collapsed at 2,800 ft. Operator was moving in spudder to swedge casing. Denver Producing & Refining Co. 1 Jewell, William Allen Survey, prospective discovery in the Simpson and Ellenburger in northwestern Grayson County between Gordonville and Sherman, was drilling below 9,342 ft. in brown lime of the Ellenburger with no further shows reported.

Gatewood field, Cooke County, reported four completions this week; Wilson field, Cooke County, and Electra field, Wichita County, three each, and Sivells Bend field, Cooke County; KMA field, Wichita County, and Nocona field, Montague County, two each. KMA field had four locations; Cooper field, Archer County, three, and Hildreth field, Montague County, two. Cooper field has 10 drilling wells, Hildreth field and Knox field, Young County, each 5.

In West Central Texas Cisco field, Eastland County, had two completions. Reddin field, Taylor County, had two locations, and Jones County Regular field and Shackelford County Regular field each had one. Stephens County Regular field has five drilling wells, Reddin field, Taylor County four; Cisco field, three, and Loving field, Stephens County, two.

SUCCESSFUL WILDCAT COMPLETIONS IN NORTH CENTRAL TEXAS

Cooke County: New oil pay—Standard Oil Co. of Texas 2 I. Beasley, John McKerley Sur. A-639, Sivells Bend pool, flowed 171 bbl. day, perf. 8,905 ft. Ellenburger, gravity 41.7°, TD 9,164.

Wichita County: New oil pool—W. T. Waggoner 1-QQ Waggoner, Sec. 39, Blk. 2, H&TC Sur., 6½ mi. W and 1½ mi. E Booger Town, elev. 1,231 ft., flowed 528 bbl. day, perf. 4,502 ft. Ellenburger, gravity 40°, CP 400 lb., TP 150 lb., TD 4,652 ft.

WILDCAT FAILURES COMPLETED IN NORTH CENTRAL TEXAS

Archer County: E. P. Bowen 1 A. L. Harris, Lot 71, J. W. Harris Subd., 6 mi. W and ½ mi. S Archer City, dry, TD 1,420 ft.

Bridwell Oil Co. 2-J L. F. Wilson, Sec. 1, SPRR Sur. A-412, 6½ mi. S and 1 mi. W Mankins, elev. 1,085 ft., dry, TD 1,670 ft.

Jack County: Hanlon-Buchanan 1-A H. P. Briley, B. C. Finley Sur. A-222, 6½ mi. S Antelope, dry, TD 577 ft.

Hanlon-Buchanan 1 Mrs. M. L. Knox, SPRR Sur. A-479, 3 mi. E and 4 mi. S Antelope, dry, TD 600 ft.

Wichita County: Benson Bros. 1 Ed Foster, Sec. 1; SA&MG Sur. A-272, 3 mi. N and 7 mi. E Electra, dry, TD 2,053 ft.

Wilbarger County: Frank Wood 1 C. Koehn, Sec. 24, Blk. 13, H&TC Sur., ½ mi. E Harrold, elev. 1,245 ft., dry, TD 2221 ft.

WILDCAT FAILURE COMPLETED IN WEST CENTRAL TEXAS

Callahan County: Anzac Oil Corp. 1 Fred Heyser, R. Green Sur. No. 220, 6 mi. NW Cross Plains, elev. 1,746 ft., dry in Montray, TD 732 ft.

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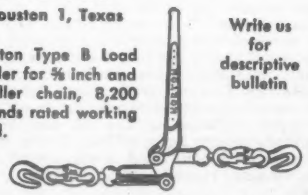

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EASTERN TEXAS

Bowie Discovery Gets Smackover Production

DALLAS.—Barnsdall Oil Co. 1 Pickering, R. E. Sevey Survey, discovery 2½ miles southeast of Texarkana and 3 miles southwest of the Eylau pool, Bowie County, on a 24-hour test through open hole from 7,036-94 ft. gaged 1,500,000 cu. ft. gas and an unestimated amount of distillate through 20/64-in. choke. Production is from the Smackover lime. Phillips Petroleum Co. 1 Grelling, Price Survey, is the first gas-distillate producer for the South Tyler James pool of southern Smith County. It flowed 28 bbl. of distillate and 400,000 cu. ft. of gas. Tubing pressure was 1,250 lb. Production is from 9,900-10,014 ft. The well had been temporarily abandoned when it failed to show for oil production.

Lone Star Producing Co. 1 Buckalew, Adrian Anglin Survey, the first oil producer from the Rodessa Section in the Opelika gas-distillate field of northeastern Henderson County, flowed 620 bbl. of oil in 24 hours through ⅜-in. choke and 750,000 cu. ft. of gas. Gravity was 41°. The well is producing through perforations from 8,827-53 ft. Ohio Oil Co. 1 J. O. Britton, Wm. Taylor Survey, wildcat in the southwest corner of Panola County, is dry at 7,001 ft. after the upper Pettit showed salt water on testing. Humble Oil & Refining Co. 1 Freeman, John Little Survey, 3 miles southeast of Brushy Creek, Anderson County, attempted to blow out at 11,545 ft. It was shut in. Pressure was built up to 500 lb. It was opened and blew off gas. Operator is coring ahead.

Hawkins field, Wood County, reported nine completions this week. Carthage field, Panola County, had two. Hawkins field had six locations; Sand Flat field, Smith County, three, and Bethany field, Panola County, two. Carthage field has 27 drilling wells; Hawkins field 23; New Hope field, Franklin County, 7; Sand Flat field, Smith County, 6.

APPALACHIAN FIELD

Water Intrudes on Mercer County Test

PITTSBURGH.—In West Salem Township, Mercer County, Pennsylvania, Hart & Hickman drilled the test on the Herman Smith farm to the Oriskany sand topped at 3,419 ft. and water intruded at 3,425 ft. The Onondaga lime extended from 3,188-3,419 ft.; Berea 425-75 ft. It is now being reamed at 3,420 ft. with a view of casing the water off.

In South Beaver Township, Beaver County, Beaver Hill Oil & Gas Syndicate reached 4,742 ft. in the Oriskany wildcat on C. C. Kennedy farm and there have a fishing job due to a gas pocket.

In Fairfield Township, Westmoreland County, Peoples Natural Gas Co. landed a string of 7-in. casing on bottom, 7,074 ft., in the Oriskany wildcat on Camilla Giffin farm and are now drilling ahead with the Onondaga chert, in which the casing was set 1 ft. from the top, expected to be about 175 ft. thick.

During the week seven new locations were announced situated in Aleppo Township, Greene County; Washington Township, Indiana County; Beaver Township, Jefferson County; Nottingham Township, Washington County; Bell and Salem townships, Westmoreland County.

In Big Sandy district, Kanawha County, West Virginia, Falling Rock Producing Co. topped the Corniferous chert at 5,244 ft. in the Oriskany wildcat on its fee. Start-

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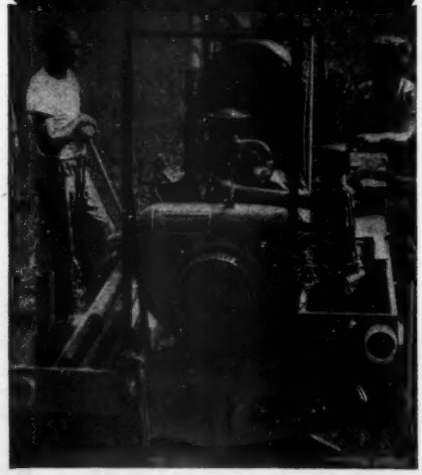

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ing from an elevation of 1,005 ft., it places the top of that formation at 4,239 ft.

In Elk district, United Fuel Gas Co. completed 5,704 Nancy E. Myers good for 3,660,000 cu. ft. gas after shot in the Oriskany sand. The surface elevation was 798 ft.; Corniferous lime 4,935 ft.; Oriskany 5,036-5,109 ft.; shot 5,004-68 ft.; total depth 5,110 ft. Here, United Carbon Co. topped the Corniferous lime at 5,273 ft. in the test on R. A. Marshall farm. In this new extension, 13 other operations are under way at present.

In Falls district, Fayette County, Columbian Carbon Co. acidized 830 Gauley Mountain Coal Co. with a resultant 900,000 cu. ft. gas open flow with the Big lime 1,468-1,640 ft., rock pressure 320 lb. in 4 days, total depth 1,641 ft.

In Jefferson district, Nicholas County, Thompson Gas Co. bottomed its No. T77 Lewis Land & Coal Co. at 2,140 ft. with the Salt sand topped at 1,470 ft. which had a short-lived volume of 492,000 cu. ft. of gas at 1,460-65 ft.; Big lime 1,881-2,130 ft.; gas gaging 103,000 cu. ft. at 2,054-2,107 ft.; gas at 2,065 ft. with about ½ bbl. oil in 4 hours; gas 2,088 ft. It will be acidized.

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ILLINOIS

Bible Grove Extension Will Test Cypress

MATTOON.—Cable tools are being moved in to start testing at W. L. Lichlyter et al 1 George Schwengel, SE SE NE 36-6n-6e, Effingham County wildcat. Tests will be made of Cypress sand saturation at 2,483-95 ft. The 1 Schwengel, drilled to a total depth of 2,860 ft., found a show of oil and water in the Aux Vases sand at 2,716-51 ft. and in the McClosky lime at 2,841-47 ft. A 1-hour drill-stem test of the McClosky at 2,822-50 ft., however, recovered only 45 ft. of drilling mud with oily streaks, and the well was plugged back to test the Cypress. It is a ½-mile extension of the Bible Grove field.

Gulf Refining Co. 1 Gale Knox, NE NE SE 4-3s-4e, has been completed in the Aux Vases sand for 561 bbl. of oil in 21 hours, natural. Saturation was found at 2,898-2,923 ft., total depth. The 1 Knox is the second well to be completed in the Bluford West pool of Jefferson County.

A new oil-producing area has been definitely opened in White County with the completion of Sinclair Wyoming Oil Co. and Ohio Oil Co. 1 E. M. Riecken, SE NW SE 1-6s-9e. Initial production was 72 bbl. of oil and 900,000 cu. ft. of gas from the Waltersburg sand at 2,299-2,315 ft., total depth. This well is a ½-mile northeast outpost of the Storms pool and opens a large new area for development.

Illinois completions during the past week totaled 37, of which 27 were oil wells and 12 were dry holes. These included two wildcat discoveries and five wildcat failures. Of the 41 new operations announced, 6 were wildcats including 2 in Coles County and 1 each in Shelby, Cumberland, Gallatin and Christian counties.

ILLINOIS SUCCESSFUL WILDCATS

Wayne County: J. J. Lynn 1 J. Dye, N½ NW NW 2-1s-7e, flowed 256 bbl., McClosky 3,148-59 ft., show oil, pay section 3,044-59 ft., TD 3,166 ft.

White County: Sinclair-Wyoming Oil Co. et al 1 Riecken, SE NW SE 1-6s-9e, flowed 72 bbl., Waltersburg sand 2,299 ft., gas, pay section 2,306-14 ft., TD 2,318 ft.

ILLINOIS WILDCAT FAILURES

Clay County: Magnolia 1 Frost, SW NW SW 4-3n-6e, dry at 3,014 ft*, Menard 2,176 ft., Tar Springs 2,289 ft., Glen Dean 2,380 ft., Golconda 2,445 ft., Barlow 2,550 ft., Cypress sand 2,573 ft., Benoist sand 2,778 ft., Aux Vases sand 2,866 ft., Ste. Genevieve 2,912 ft., Rosiclare 2,930 ft., McClosky 2,975 ft.

Clinton County: B. F. Thompson 1 Roper, SE SE SW 4-1n-1w, dry at 1,468 ft., Glen Dean 1,708 ft., Golconda 1,174 ft., Barlow lime 1,241 ft., Cypress sand 1,302 ft., Paint Creek 1,430 ft.

Cumberland County: F. R. Stocker 1 J. Cooper, NE NE NW 34-10n-7e, dry at 2,477 ft., Tar Springs sand 1,878 ft., Glen Dean 1,961 ft., Barlow 2,082 ft., Cypress sand 2,116 ft., Paint Creek 2,184 ft., Renault 2,268 ft., Aux Vases sand 2,280 ft., Ste. Genevieve 2,329 ft.

Hamilton County: National Associated 1 M. Neal, NW NE SE 32-5s-7e, dry at 3,113 ft., no tops.

Moultrie County: Fryer-Simpson Drlg. 1 Waggoner, NW NW SW 23-12n-6e, dry at 2,185 ft., Glen Dean 1,738 ft., Golconda 1,803 ft., Barlow lime 1,862 ft., Cypress sand 1,906 ft., Renault 2,023 ft., Aux Vases sand 2,028 ft., Ste. Genevieve 2,074 ft., Rosiclare 2,092 ft., Fredonia 2,118 ft.

OKLAHOMA

Grady County Well Seeking Porous Zone in Sand Series

THE majority of Oklahoma wildcats were in a routine stage at the close of the week with two drilling wells of Magnolia Petroleum Co. in Grady County sharing the top interest of oil operators. The Magnolia 1 Britt Unit, SE NW SW 3-4n-6w, near the Chitwood pool and the deepest drilling well in Oklahoma at the present time, is drilling below 10,965 ft. and looking for a soft spot in the sand series encountered at 10,900 ft. After coring and drilling hard sand at 10,951 ft., the bit penetrated a shale zone and then entered another section of hard sand to 10,962 ft. This well is about 1 mile southeast of a recent discovery.

Magnolia 1 Spiers, SW SW 28-5n-6w, also in Grady County, is drilling in sand and shale below 9,759 ft. Both the 1 Britt Unit and the 1 Spiers are key wells in the Anadarko Basin play and are being closely watched.

The California Co. 1 Wright et al, NE NW 13-8s-1w, Love County wildcat, is drilling below 6,000 ft. and reported to be running about 26 ft. higher structurally than an outpost well in the Sivels Bend pool of northeastern Cooke County, Texas, which is just across the Red River. The oil zone in the lower Strawn horizon is anticipated at approximately 6,200 to 6,400 ft., but no oil shows have been encountered so far.

Potential tests are being made at Atlantic Oil Co.'s gas discovery in Washita County, 1 Hill, NW NW NW 25-8n-18w. The well is producing through perforations opposite the Springer sand at 6,150-85 ft. and 6,190-6,235 ft., which showed a total of approximately 25,000,000 cu. ft. of gas on previous drill-stem tests.

OKLAHOMA SUCCESSFUL WILDCATS

Hughes County: Robert Brown 1 Jackson, NE NE NW 24-9n-9e, 1,000,000 cu. ft. gas at 2,563-87 ft., TD 2,587 ft., Booch 2,553 ft.

Iron Drilling Co. 1 Davis, SE NE NW 15-6n-8e, 6 bbl. from sand at 2,599-614 ft., TD 2,624 ft.

Logan County: J. E. Tripp 1 Le Grande, NE NE SW 26-15n-1w, 1,500,000 cu. ft. gas from Bartlesville at 5,207-19 ft., TD 5,420 ft.

Stephens County: W. H. Atkinson 1-A

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Peck, SE SW SW 32-2s-6w, 69 bbl. from Fossil limestone at 2,440-83 ft., TD 2,483 ft.

OKLAHOMA WILDCAT FAILURES

Caddo County: Kolp & Holmberg 1 Kelley, NE SW NE NE 4-5n-12w, dry at 1,682 ft., broken limestone 1,630-75 ft.

Choctaw County: R. O. Haubelt 1 Schuessler, SW SE NE 14-6s-14e, dry at 2,360 ft., limestone 1,558-83 ft.

Hughes County: G. M. Piggot 1 Price, NW NW SW 33-8n-10e, dry at 3,612 ft., Cromwell 3,547 ft.

Lincoln County: Crawford & Blankenship 1 Murphy, SW SE NE 24-15n-5e, dry at 3,475 ft., Skinner 3,445-75 ft.

Olson Drilling Co. 1 Hausaman, NE NE NW 29-16n-5e, dry at 3,513 ft., Prue 3,469 ft.

Oklahoma County: C. C. Peppers 1 Moyer, NW NW NE 13-14n-2w, dry at 6,387 ft., dolomite 6,190 ft.

Stephens County: Lundy & Shear 1 Massie, NE NE NW 31-1s-5w, dry at 3,502 ft., sand 3,060-80 ft.

W. H. Atkinson 1 McCutchens, NW SE SW 22-2s-8w, dry at 3,477 ft.

CALIFORNIA

Navy Soon to Complete Another Stevens Sand Well

LOS ANGELES.—The Navy Department, under supervision of Capt. Harry Stolz and Capt. V. H. Wilhelm, will soon complete another Stevens sand well in the Hillcrest section of the Elk Hills Naval Petroleum Reserve No. 1 and if this projected completion comes up to expectation the Navy Department will have a tremendous reserve in California. The most important well at Elk Hills is 44-24-Z, located in Section 24-30s-22e, approximately ½ mile east of the western boundaries of Naval Petroleum Reserve No. 1. The Hillcrest anticline appears to be rising to the west and may extend out beyond the present limits of the reserve, and if so the Navy Department will be obliged to acquire title to necessary acreage in order to protect its holdings from drainage.

Very little trouble is anticipated from this standpoint as most of the potentially productive acreage outside the reserve is held by Standard Oil Co. of California, which company has assisted the Navy Department in its development program. In order to acquire this additional acreage, the federal Government would not be obliged to pay out any cash if it wished to exchange oil from the older sections of the field as is now being done on the basis of 15,000 bbl. per day until Standard's equity is liquidated.

Navy's 44-25-Z logged top of the Stevens sand of Miocene age at 5,220 ft. and at 5,452 ft. was still in the pay. Approximately 2 miles southeast of this well, top of the Stevens was found in 342-29-R at 5,302 ft. or 82 ft. lower than in 44-24-Z to the northwest. Navy's 342-29-R is located in Section 29-30s-23e, and was completed a short time ago flowing 523 bbl. from the Stevens sand at 5,726 ft. through a restricted bean. This well took a penetration of 424 ft. in the Stevens and if a similar penetration is taken in 44-24-Z the completion depth will be 5,644 ft.

Navy's development program at Elk Hills contemplates the determination of the extent and productivity of the Stevens sand of Miocene age and other probable productive sands at deeper levels. When this field is shut down, all productive wells will be left in such a condition that maximum production could be reached in 30 days in case of an emergency. Nine drilling strings are running in the field.

Independent Exploration Co. appears to have found a new oil sand in the Sheep Springs area of Kern County in Section 17-29s-21e. The oil sand, topped at 2,790 ft., is believed higher stratigraphically than the producing zone at Sheep Springs. The well is located about ½ mile northwest of production at Sheep Springs and may be a separate accumulation along the Sheep Springs fault. On the adjoining section, Union Oil Co. developed some small production on the Richardson property but these two small wells have not been produced for several months. Standard of California holds acreage to the east and Richfield and Union to the west of this new potential producer. Many wells have been drilled in this region in past years but in most cases these tests were not carried deep enough and do not now constitute adequate tests. Faulting and the pinching out of oil sands over relatively short distances are dominating characteristics of this area.

Ohio Oil Co., after attempting to make a formation test which was unsuccessful because of a packer failure, has resumed drilling in its Gardena wildcat located about 1 mile west of the Dominguez field but still has some distance to go before reaching the point at which oil sand was found in its initial test.

British-American, Seaboard, and Texas Co. recently were granted approval to slant drill under Alondra Park west of Gardena but no immediate drilling is contemplated. This lease was secured from the Los Angeles board of supervisors for a cash bonus of $51,000 and 17½ per cent royalty. At 9,895 ft. the present test appears to be running somewhat higher than the first hole to the southeast.

Reflecting the completion of excellent flowing wells in several fields, state production of crude oil has for several months exceeded the prescribed allotment by approximately 20,000 bbl. per day. Present allotment is based for the most part on the maximum efficient rate of production and is probably lower than the actual demand. Most of the overage is attributed to the Coalinga Nose field which has been producing from

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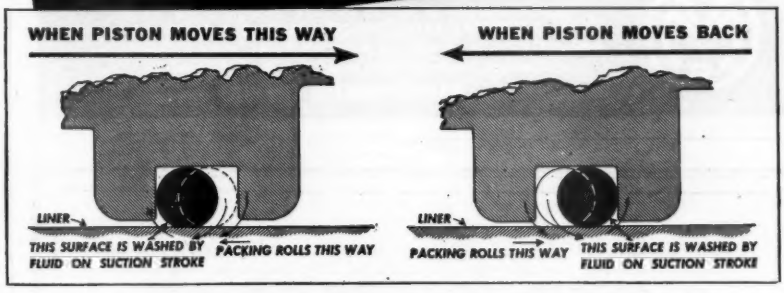
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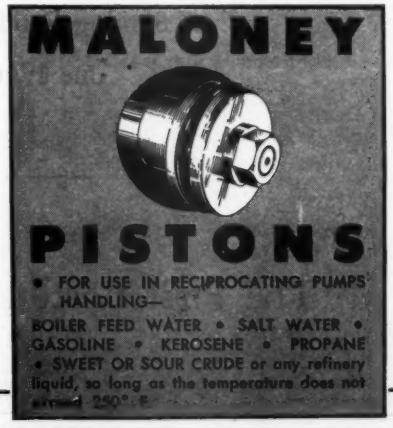
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15,000 to 17,000 bbl. per day above the field's quota, due to a difference of opinion as to what constitutes maximum efficient rate of production. Most other fields have been holding to their respective quotas but at frequent intervals new wells upset plans.

CALIFORNIA WILDCAT FAILURES

Fresno County, Tranquility: Texas 1 Shiells Co., 16-16s-15e, could not recover fish, only minor encouragement, TD 8,386 ft.

Kern County, Bacon Hills: Bandini Pet. Corp. 1 Bacon, 27-28s-20e, formation in bottom of hole too tight to produce, had encouraging showings, on test of upper showings casing was found to have collapsed at 6,134 ft., could not get bit below that point, TD 11,011 ft.

San Emidio: Western Gulf 2 San Emidio, 35-11n-22w, bottomed in hard gray sand, only minor showings, TD 6,594 ft.

South Portals: J. P. Getty 8-8 J.A.C., 8-30s-29e, lower portion of hole barren, intervals at 3,345-55 ft. and 3,367-75 ft. tested wet, TD 6,560 ft.

Los Angeles County, Aliso Canyon: Wilshire 1 Marquis, 35-3n-16w, abandoned primarily because of complicated fishing job, had some encouragement, TD 9,442 ft.

Orange County, Huntington-Newport: Pacific Butte Mining Co., 1 H.B., 13-6s-11w, bottomed in lower Ashton barren gray sand, only minor showings, TD 5,059 ft.

OHIO, KENTUCKY

Clayton Pool Extended One Location Eastward

COLUMBUS. — Price Oil Co. 1 Charles Hammer, Section 10, Clayton Township, Perry County, proves up another quarter section along the east side of the Clayton pool. Clinton sand was found at 3,273-3,314 ft. and produced 100 bbl. in 24 hours.

A 3,480,000 cu. ft. well was completed in Northeast LaGrange Township, Lorain County, after two small wells and a dry hole had been drilled. Completed by the Ohio Fuel on 1 R. Walkden, Lot 33, sand was logged at 2,418-31 ft. Two offsets has been approved.

William Pfeiffer 1 I. F. Wagner, Section 32, Perry Township, Stark County, extends the Richville pool ½ mile farther west. White Clinton at 4,249-73 gaged 1,400,000 cu. ft. natural.

Lancaster field again led in new locations with 8 out of 18 reported. Cambridge had six, and Ashland and Brush Creek each two. Of the 21 completions, Ashland led with 6.

OHIO WILDCAT FAILURES

Carroll County, Brown Township: Belden et al 1 Meri Stefkovic, Sec. 1, Clinton 5,171-5,290 ft., TD 5,321 ft.

Medina County, Litchfield Township: Ohio Fuel 1 W. D. Lose, Lot 54, Clinton 2,937-60 ft., TD 3,015 ft.

EASTERN KENTUCKY

ASHLAND.—Two gas completions, one for oil, a dry hole and cleaning out operations marked activities in the eastern Kentucky field during the week.

Inland Gas Corp. completed well No. 280 on the C. C. Rice property, Rock House Creek in Johnson County, total depth 2,439 ft. in Red Rock, with daily open flow estimated at 192,000 cu. ft. of gas in Big Six sand.

Kentucky-West Virginia Gas Co. completed well No. 5631 on the Lee Slone property in Knott County, total depth 2,715 ft., with daily open flow of 119,000 cu. ft. of gas in shale.

Ashland Oil & Refining Co. completed well No. 17 on the Northcutt 160-acre tract in Menifee County, total depth 836 ft., for 5 bbl. before acid.

Ashland Oil & Refining Co. and A. V.

Hoenig completed well No. 1 on the J. B. Lewis farm, Elliott County, total depth 940 ft., dry.

Henry Ball conducted cleaning-out operations on old wells, Sarah Williams property on Big Sinking Creek, Lee County, formerly owned by Rex Oil & Gas Co.

WESTERN KENTUCKY

OWENSBORO.—Western Kentucky completions during the past week totaled five, including three oil wells and two dry wildcats, both in Union County. Six new operations were announced, all of which were field wells.

Wildcats in the western Kentucky area at the present time are J. V. Canterbury 1 W. B. Holt, 12-O-18, Union County, a lo-

(Continued on page 143)

MISSISSIPPI

Warren County Wildcat Opens New Gas Field

JACKSON.—A new gas field has been opened northeast of Vicksburg on the Kings Dome, Warren County, Mississippi. The Magnolia Petroleum Co. 2 Ruth Pidgeon, E½ SW SE SE 27-14n-4e, flowed at the rate of 1,090,000 cu. ft. of gas per day. Production tests were taken at 2,066 ft. Total depth of the well is 2,546 ft., and Wilcox was topped at 2,510 ft.

Tests are continuing on the Phillips Petroleum 1 Davey, 330 ft. from the northeast line of Lot 3 and 330 ft. from northwest line of 46-8n-2w, Adams County, Mississippi. After acidizing perforations at 10,060-70 ft., the well is flowing oil and salt water at the rate of 8 to 9 bbl. per hour through ¼-in. tubing choke. Total depth of the well is 10,514 ft.

Seven wells were completed in Mississippi. Hub, Baxterville, Eucutta, and Fayette fields each added one oil producer. Three wildcats were dry.

MISSISSIPPI WILDCAT FAILURES

Holmes County: Cities Service Oil Co. 1 Will Luster, NW SW 35-14n-2e, dry at 6,157 ft., Tuscaloosa 5,520 ft., Comanche 6,102 ft.

I. P. LaRue 1 J. A. Weeks, east of northwest corner of SE NE 20-15n-5e, dry at 4,503 ft., Massive sand 3,960 ft., Comanche 4,212 ft.

Kemper County: S. Friedman, Jr. 1 J. W. McKelvaine, SE NE NE 2-9n-17e, dry at 1,158 ft., Eutaw 1,293 ft.

LA.-ARK.

Choudrant Prospect Well Has Slight Show of Gas

SHREVEPORT.—A drill-stem at 9,107-30 ft. in the California Co. 1 Richards, SE 11-8n-2w, Lincoln Parish, flowed out water cushion and made gas with a spray of distillate. The well, on the Choudrant prospect, topped Bodcaw sand at 9,100 ft. Operators are coring ahead below 9,175 ft.

Atlantic Refining Co. 1 Louisiana Central-D, NE SW 20-15n-3e, Caldwell Parish, flowed 4,140,000 cu. ft. of gas on a drill-stem test. The well is in the Vixen area. Testing is being continued.

Oil and water resulted from a test in the Lechner & Hill 1 R. W. Wesson, NE NE NE 25-15-19, Wesson field, Ouachita County, Arkansas. The hole is being plugged back to 2,918 ft. from a total depth of 3,501 ft.

The Texas Co. 1 Mrs. C. W. Person, NW SE 29-16-25, a wildcat in Miller County, Arkansas, had no shows from a test at 3,362 ft. The well was cored at 3,352-62 ft. and drilling is being continued.

North Louisiana had 11 completions. Two wildcats, one in Morehouse Parish and one in West Carrol, were dry. Nine field wells were completed, of which five were oil, three were gas, and one was dry.

Arkansas had one successful completion, an oil producer in Champagnolle field. The Stephens field well was dry and the wildcat in Prairie County, dry.

ARKANSAS WILDCAT FAILURE

Prairie County: M. W. Martin et al 1 W. H. Stewart, 1,600 ft. south and 200 ft. east of northwest corner of 3-3n-5w, dry at 2,330 ft.

NORTH LOUISIANA WILDCAT FAILURES

Morehouse Parish: Sohio Petroleum Co. 1 McDuffie, 990 ft. north and 2,310 ft. west of southeast corner of 32-19n-7e, dry at 6,672 ft.

West Carroll Parish: Texas Pacific Coal & Oil 1 Singer Manufacturing Co., SE SE SW 33-19n-6w, dry at 6,015 ft.

ROCKY MOUNTAIN

Continental Rechecks Geology of Rangely

DENVER.—A recheck of the geology of the Rangely field in western Colorado by the geological department of Continental Oil Co. following the completion of its 1 Rooth for 36 bbl. an hour at a location 1½ miles northwest of the nearest producer indicates that some important revisions of the structural maps are in the offing. The Mancos shale and the overlying Mesaverde formation, both of Cretaceous age, are the only rocks exposed at the surface in the field. The United States Geological Survey in mapping the structure used as a datum for convenience in drawing contours a persistent bed of limestone which lies about 15 ft. above the base of the Mesaverde. This map shows the anticline to be about 20 miles long and 8 miles wide. As shown by the structure contours, the axis trends west on the east end and northwest on the west end. The Rooth well was the first drilled any great distance out from the apex and therefore furnished the first subsurface data upon which to base any confirmation of the surface geology on the west side. A correlation of the log of this well with the logs of wells farther to the east and southeast indicates that the axis of the anticline trends westward on the west side instead of northwest as shown by the surface geology, and that the Rooth well is on the north side instead of the south side as heretofore believed. A south offset to the Rooth well is getting under way, and if it confirms the new evidence, Continental will have about 14 40-acre locations to drill instead of the 4 or 5 previously believed to be within the productive area.

Iles deep test spudding.—Stanolind Oil & Gas Co. 1 Madison, NW SW SE 22-4n-92w, Iles field, Moffat County, Colorado, which will test the Weber sand, the producing horizon at Rangely, and the underlying Madison lime, has spudded. It is the first well in the producing Moffat County fields to drill below the Sundance, and, therefore, will be watched with considerable interest. A Sundance sand well approximately 100 ft. away was completed recently at 3,315 ft., and flowed 24 bbl. per hour through a 24/64-in. choke. The interval between the Sundance and Weber is estimated at 1,300 ft., and between the top of the Weber and the Madison at 2,000 ft.

Greasewood well to go to Dakota.—Colorado Unit Corp. 1 Kirchoff, NE NW SW 11-6n-61w, Weld County, Colorado, a discovery in the Muddy sand, topped at 6,753 ft., went out of that sand at 6,780 ft., and is drilling ahead at 6,785 ft. It will drill about 20 ft. deeper and then core with cable tools for the top of the Dakota. Oil rose 3,500 ft. in the hole when the bit was 5 ft. in the upper sand, but the lower section showed no increase in oil or gas. The location is a mile to the northwest of the old Greasewood pool.

Ohio Oil Co. in Prowers County.—Ohio Oil Co. has leased up a block of 50,000 acres in Prowers County, southeastern Colorado, and is reported unofficially to be planning for a test this spring. The center of the block is in 16-27s-46w, and adjoins on the west what was known as the old Cosden block. This was the Two Buttes structure and was tested by Lamar Oil Co. and Chesapeake Oil Co. in 1924 in 1 Johnson, SW SW NW 30-27n-45w. The high consisted of a fold around a volcanic plug. It had several good shows in upper horizons, but sands of importance were absent in the lower sections, and the well was dry at 5,026 ft. The center of the Ohio block is 4 miles to the northwest.

Unique completion at Table Mesa.—In 1923, a group of oil men attending a sale of Indian leases at Santa Fe induced one of their number, A. E. Carlton, a wealthy Colorado mining man, to start the bidding on the Table Mesa structure. He opened the bidding at $17,500. Nobody offered any more and it was knocked down to him. Producers & Refiners drilled a test and found water. Continental Oil Co. then made a deal and drilled another well close by on the Carlton acreage. It came in for 325 bbl. daily of high-gravity oil at 1,315 ft. Subsequently the field produced around 600,000 bbl. of oil. The pool was drilled up and production gradually dropped to the vanishing point. No new wells were drilled for 10 years. Then in 1939, like taking a

(Continued on page 150)

KANSAS

Drilling Deeper in Meade County Test

AFTER perforations at 6,018-40 ft. in the upper Mississippi and pumping 9.69 bbl. oil in 10 hours, the zone has been abandoned because of water increase at the Stanolind Oil & Gas Co. 1 H. G. Adams, SW SW SW 7-35-29w, a wildcat in southwestern Meade County. At last report, operators were drilling at 6,371 ft. Lansing was topped at 4,268 ft. and Mississippi at 5,845 ft. The well is located 5 miles east of the Meade County gas discovery well, Stanolind 1 A. Adams.

Pump is being installed at the Sumner County discovery well, Ashland Oil & Refining 1 James, NW SW NE 36-32-2e. Two barrels an hour were swabbed from the Arbuckle at 3,469 ft. The well is located 2 miles southwest of the Slick-Carson pool.

Kansas had 34 completions. Of the seven wildcats, one was completed as an oil well and the remainder as dry holes. Field well completions totaled 46 of which 6 were gas, all in the Hugoton field, 33 were oil and 7 were dry.

KANSAS SUCCESSFUL WILDCATS

Phillips County: Helmerich & Payne and Tide Water 1 Bowman, NW NW SE 3-5-20w, 200 bbl. oil from Kansas City-Lansing at 3,149-76 ft., TD 3,554 ft.

KANSAS WILDCAT FAILURES

Morris County: Nadel & Gussman 1 Novak, NW NW NW 30-17-5e, dry at 2,375 ft., Mississippi lime 2,345 ft.

Norton County: Helmerich & Payne 1 J. Kitzke, SE SE SE 16-5-21w, dry at 3,711 ft., granite 3,705 ft.

Stafford County: R. H. Shields 1 Sheppard, C W/2 SW SE 16-22-11w, dry at 3,607 ft., Arbuckle 3,591 ft.

Sumner County: E. S. Adkins 1 Tolten, SW SW SW 10-33-2e, dry at 3,495 ft., Arbuckle 3,471 ft.

Trego County: Continental Oil Co. 1 Rhoades Estate (No. 39 Strat.) NW SE SE 34-11-23w, dry at 4,190 ft., Arbuckle 4,162 ft.

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Among the Drilling Contractors

Drilling crew of Harper-Turner Oil Co. on location at the 1 School Land, north and east of West Edmond, Okla.: George J. Trowles, driller; Ray Grammer, motorman; Woodie Savage, backupman; Lige Mosley, pipe racker, and W. R. Davis, derrickman

Robert W. Atha Drilling Co. has the contract to drill a wildcat for McClure Drilling Co. in Missaukee County, Michigan. The well is the 1 A. Jameson, in NE NW NW 31-22n-7w.

Can-Tex Drilling Co. of Calgary, Alta., has moved to larger quarters in the Lancaster Building in that city.

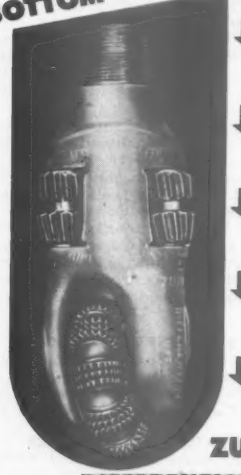
Harry Stroud Drilling Co. will drill the Michigan Devonian Petroleum Co. 1 Peter & Martha Graczyk, SE SW NW 30-4n-12w, in the Dorr field, Allegan County, Michigan.

H. H. & B. Drilling Co., Wichita, has been awarded drilling contracts by Varco Oil and Continental Production companies for two wells to start immediately in the North Paulding extension area of Hughes County, Oklahoma. Work was starting on the Varco et al 1 Whitney, in SW NW SW 3-6n-8e, and location was staked for the 1 R. B. Parks, in NE NW SE 3-6n-8e.

I. F. Scott Drilling Co. has the contract to drill the Sohio Petroleum Co. 3 Gilmore Gas Unit, C NE 16n-5w, in the Gilmore field, Isabella County, Michigan.

Harry L. Bell, William H. Dunlap, Leo E. Minihan, and William R. Law have organized a new contract drilling company to be known as the **Bell-Dunlap Drilling Co.** The new com-

HOLE OPENING & BOTTOM HOLE DRILLING WITH



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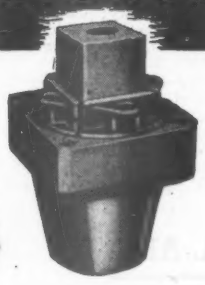

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DELTA (1 swivel) ⅜" chain
DIXIE (2 swivels) ⅜" chain

MALLEABLE IRON LOAD BINDER Heat Treated

LONE STAR No. 1—14 lbs. (2 swivels) ⅜" and ⅜" chain
LONE STAR No. 2—16½ lbs. (2 swivels) ½" and ⅜" chain

DROP FORGED LOAD BINDER Heat Treated

No. 1—10 lbs. (2 swivels) ⅜" and ½" chain
No. 2—17½ lbs. (2 swivels) ½" and ⅝" chain

STEEL CONSTRUCTION WIRE STRETCHERS

No. 90—3 Pulley, plain or roller bearings, ⅜" rope
No. 75—4 Pulley, plain or roller bearings, ⅜" rope
No. 80—4 Pulley, roller bearings, ½" rope

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pany will maintain offices in Los Angeles.

Lupher Drilling Co. will drill the 2 Peter Dent for Sohio Petroleum Co. in N½ NW NW 5-15n-6w, Sherman County, Michigan.

Union Rotary Corp. has the contract to drill the 1 Ensch-Classon in SE 4-15n-9w, Colfax field, Mecosta County, Michigan.

Victor Drilling Co. has been organized by Victor M. Scheef of Mattoon, Ill., who will operate a rotary rig.

Tulley & Carter Drilling Co. has been organized recently by John S. Carter of Fairfield, Ill., and W. R. Tulley of Evansville, Ind. They will operate rotary and cable completion tools in any part of the Illinois basin area.

Kentucky Fields

(Continued from page 141)

cation; Calstar Petroleum Co. 1 C. Blake, 22-P-20, Union County, being put on pump for a test of the Cypress after an 80-qt. shot; Mitchell 1 Thornberry, 5-N-23, Henderson County, drilling at 2,466 ft., and the Delta Drilling Co. et al 1 Anna Lee Boswell, 7-P-26, Henderson County, drilling at 2,156 ft.

WESTERN KENTUCKY WILDCAT FAILURES

Union County: So. Penn Oil 1 D. C. Stevenson, 14-N-18, elev. 412 ft., dry at 3,388 ft., Glen Dean 2,683 ft., Golconda 2,826 ft., Barlow 2,963 ft., Renault 3,128 ft., Ste. Genevieve 3,200 ft.

Penn-Indiana Oil Co. 1 Anderson, 19-O-19, elev. 403 ft., dry at 2,758 ft., Menard 1,744 ft., Waltersburg 1,867 ft., Viola 1,925 ft., Glen Dean 2,013 ft., Golconda 2,162 ft., Barlow 2,293 ft., Cypress 2,330 ft., Ste. Genevieve 2,593 ft., Fredonia 2,627 ft.

INDIANA

EVANSVILLE.—Indiana activity continued quiet during the week with only one completion reported. This well was the C. A. Lynch et al 5 Joel Vail, NW NW 23-5s-14w, Posey County, completed in the Clore sand at 1,948-61 ft. for 150 bbl. of oil daily. It was shot with 20 qt. No wildcats were included in the three new operations reported.

John Kabana 1 Coleman Community, SW SW NW 7-2s-9w, Gibson County discovery, is pump testing the Rosiclare at 1,792-98 ft. No pumping gage has been revealed, but the well swabbed at the rate of 10 bbl. of oil an hour while cleaning out.

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PERSONALS

Gere Has Held Wide Range of Jobs in Gas Company

JOHN L. GERE, operating engineer, Cities Service Gas Co., was transferred to the Oklahoma City general offices last December when he was promoted from his former position as assistant superintendent of operations at Bartlesville.

Gere was born in 1906 at Hilo, Hawaii, where his father was a construction engineer. After receiving a degree in mechanical engineering at the University of Nebraska, he joined Cities Service Gas Co. in 1927, working on pipe line construction near Kansas City. In 1928, he was meter inspector at Bartlesville in charge of the Kansas City district and tested new lines in the leakage department. In 1929 and 1930 he was a cost engineer and later general meter inspector.

He became superintendent of the gas pipe line division at Blackwell, Okla., in 1932. In February 1935 he returned to Bartlesville to hold again the position of general meter inspector. After 5 months he moved to Drumright, Okla., as pipe line superintendent. In October 1936 he was back at Bartlesville as assistant superintendent of pipe lines. He became field engineer at Pampa, Tex., in February 1939, but Bartlesville was again his headquarters in November 1940 when he became assistant superintendent of gas measurement. Two months later he was made gas division engineer and in June 1944 assistant superintendent of operations. At times in 1934 and in 1940 he was engaged in special assignments in inspecting pipe lines in connection with original cost studies.

Charles A. Miller, The Texas Co,. has succeded **J. L. Risinger,** Socony-Vacuum Oil Co., as chairman of the American Petroleum Institute's central committee on accident prevention.

John W. Cummings, recently released after military service and formerly with Continental Supply Co., will become warehouseman for Socony-Vacuum Oil Co., Inc., in Cairo, Egypt.

L. B. Snow, associate chief engineer of Gulf Oil Corp., has been elected president of the Houston branch of the Texas section, American Society of Civil Engineers.

Donald Lincoln, formerly manager of the refinery production control division of Sun Oil Co., has been appointed manager of the refinery sup-

DONALD LINCOLN

C. JOHNSON

ply and distribution division of the company. **Clifford Johnson,** formerly superintendent of maintenance of Sun's Marcus Hook, Pa., refinery, has been made assistant superintendent in charge of maintenance and construction. Johnson succeeds **Alan T. Knight** who was recently elected vice president of the newly organized Catalytic Engineering & Design Co. Other new appointments in the Sun organization: **John E. Lilley,** formerly project engineer, made chief construction engineer at Marcus Hook; **Vaughn S. Whitesell,** made chief maintenance engineer at Marcus Hook; **Howard B. Sheppard,** made project engineer in the company's manufacturing department in Philadelphia; **A. Cyril Daldy,** formerly assistant director of foreign refining of the Petroleum Administration for War, made a member of the public relations staff.

J. O. Meyers, formerly of Houston, has been transferred to the San Antonio district office of Shell Oil Co., Inc., as senior geologist.

F. W. Killingsworth and **J. W. Clampitt,** drilling foremen for Iraq Petroleum Co., Ltd., are spending a 90-day leave at their homes in California.

Frank Hendershot, drilling foreman of Bahrein Petroleum Co., Ltd., recently left New York for Bahrein Island where he will supervise drilling of a deep test.

W. A. Jones, assistant superintendent of the Seminole, Okla., district of Carter Oil Co., has been transferred to the Wilson district which now includes the company's producing operations in McClain and Cleveland counties. Headquarters of the district have been moved from Wilson to Purcell.

Robert R. Eckhart, Jr., has rejoined Shell Oil Co., Inc., as junior exploitation engineer at Houston following service as a lieutenant in the Navy. Also back with Shell is **Clifford H. Taylor,** mechanical engineer at Kilgore who was recently released as a Navy lieutenant commander after 3½ years of service.

Raymond P. Chennels, assistant drilling superintendent of Anglo-Ecuadorian Oil Fields, Ltd., is spending a leave at his home in Salisbury, Wiltshire, England.

M. F. Astle, formerly chemist-in-charge at Martinez, Calif., for Shell Chemical Corp., has been made senior technologist in Shell's head office in San Francisco. In the manufacturing department of Shell Oil Co., Inc., **Henry W. Anderson,** research and development technologist at San Francisco, has been made research laboratory technologist at the Martinez refinery; **Frederick S. Hemmel,** technical assistant at San Francisco, has become senior technologist at the Martinez refinery; and **Cyril M. McKenna,** technologist at the Wilmington, Calif., refinery, has been named technologist in the San Francisco office. In the Shell Chemical organization, **G. E. Saffa,** junior chemist at San Francisco, has been made a junior technologist and transferred to Chicago.

A. J. Saxe, manager of the northern division of South Penn Oil Co., has been named a vice president by the directors. Another new appointment is that of **R. W. Grunert,**

formerly assistant to the president, to be secretary of the company.

Albert C. Patterson has been named assistant manager of the Esso laboratories, process division of Standard Oil Co. of New Jersey. His appointment follows the recent promotion of **Norval F. Myers,** former associate manager, to assistant chief engineer of the Esso engineering department. Patterson, a former group head in charge of cracking data, will be responsible for correlation and theoretical studies, thermal cracking, catalytic cracking, hydrogenation, and hydroforming.

A. J. Wacker, production foreman for Tropical Oil Co. at Barranca, Bermeja, Colombia, is vacationing in the United States.

James T. Harlan, formerly junior engineer for Shell Development Co. in the engineering department at Wilmington, Calif., has been transferred to San Francisco.

Dr. H. J. Tschopp, operations manager of The Shell Co. of Ecuador, Ltd., has been in New York following a trip to the company's London headquarters. He is returning to Quito.

Paul Dana has returned to Carter Oil Co. as an engineer at the Cut Bank, Mont., refinery after 42 months of service as a pilot in the Army Air Forces.

Frank J. Williams, night superintendent of the Paulsboro, N. J., refinery of Socony-Vacuum Oil Co., Inc., has been transferred to the Olean, N. Y., refinery and made assistant superintendent.

Maurice V. Adams has rejoined Carter Oil Co. as senior petroleum engineer at Seminole, Okla., following his release from the Army.

Samuel F. Bowlby has been advanced from chief exploitation engineer to assistant production manager in the Los Angeles office of Shell Oil Co., Inc. Other recent personnel changes in the production department of the company's Pacific Coast territory include **Edward H. Channel,** from foreman of the absorption plant at Ventura to superintendent of natural gasoline in Los Angeles; **Carl Denoon,** from operator in charge at Dominguez to assistant foreman of the absorption plant at Bakersfield; **Abraham B. Faoro,** from mechanical engineer at Los Angeles to foreman of the Ventura plant; **Wilbur E. Larson,** from junior mechanical engineer at Ventura, to mechanical engineer at Los Angeles; and **George B. Israel,** from foreman of the absorption plant at Brea to foreman of the absorption plant at Dominguez.

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Interested parties may obtain the necessary bid forms from the supervisor mentioned above or from F. E. Bates, Regional Business Manager, Farm Security Administration, 319 Donaghey Trust Building, Little Rock, Arkansas.

Sealed bids in duplicate will be received in the office of F. E. Bates at the above address until 2:00 P.M., C.S.T., April 18, 1946.

Equipment Men in the News

Boyd Joins G. M. Diesel Oil-Field Staff

Arch F. Campbell, manager of the petroleum industry sales office of General Motors Detroit diesel engine division, has announced the appointment of King D. Boyd as district manager of petroleum industry sales in the Gulf Coast region. Boyd will be located in Houston.

K. D. BOYD

Strand Heads New Export Office

The opening of a new export office in New York by The General Detroit Corp., Detroit, and its affiliate, The General Pacific Corp., is announced by E. A. Warren, vice president and treasurer. In charge of the office will be the newly appointed manager of export operations, R. J. Strand. Export operations will be carried on in Latin America, Europe, the Middle East and the Far East, concentrating on the sale of fire extinguishers, motor fire apparatus, and allied products.

R. J. STRAND

Argentine Representation Announced

Mario L. Villa, president of Tecnica Industrial y Comercial Petrolera, S. A., Buenos Aires, announces that his firm has been appointed exclusive representatives for Byron Jackson Co., Patterson-Ballagh Corp., and International Cementers, Inc., for Argentina. In addition this firm is exclusive representative in that country for Continental Supply Co. and handles Lummus for Argentina, Bolivia, Chile, Paraguay and Uruguay.

Oil Well Supply Establishes Three Sales Divisions

Establishment of three new domestic sales divisions to provide closer customer service to the oil country is announced by Oil Well Supply Co., Dallas, U. S. Steel subsidiary.

The new arrangement provides six domestic divisions. These, with their managers are:

Central Midwest division, comprising the West Texas, North Texas, East Texas, northern Louisiana and Arkansas districts; K. B. Winstead, division manager; headquarters at Dallas.

Mid-Continent division, including all activity in Oklahoma and Kansas; Mark Barkhurst, division manager; headquarters at Tulsa.

Gulf Coast division, including all activity in Southwest Texas and Gulf Coast districts, including the states south of Tennessee and North Carolina; P. H. Shepherd, division manager; headquarters, Houston.

Rocky Mountain division, comprising the Canadian district and the area now covered by Rocky Mountain district: R. L. Armstrong, division manager; permanent headquarters, Denver.

California division, comprising all Pacific Coast area operations formerly included in this division; Warner F. Parker, division manager; headquarters, Los Angeles.

Eastern division, comprising as formerly all states east of the Mississippi River and north of Tennessee's and North Carolina's southern borders; R. R. McAfee, division manager; headquarters, Columbus.

Sherwood Promoted by Alco

Appointment of Roland R. Sherwood as assistant to the president of American Locomotive Co., New York City, has been announced by Robert B. McColl, president. Sherwood joined the locomotive company in 1939 and became assistant to the executive vice president last September.

Carle Leaves for South America

Guy F. Carle, sales engineer for Kerotest Manufacturing Co., Pittsburgh, has left the states for a 2-month trip through the oil fields of Venezuela and Colombia. Carle, a specialist on well control system, is a graduate of Carnegie Institute of Technology and a member of several technical organizations.

Smith Oil Tool Builds Heat-Treating Plant

A new $150,000 heat-treating plant has just been built by H. C. Smith Oil Tool Co., Compton, Calif., and is now in operation.

Housed in the new modern structure is the latest type equipment for heat treating, quenching and tempering operations.

H. C. Smith, president of H. C. Smith Oil Tool Co., Compton, Calif., and Otto Schmidt, the company's chief engineer, with the latest type Smith six-point holeopener and four-point holeopener

Additional Appointments Announced by Armco's Rustless Division

Formation of a new department and several additional executive appointments to the staff of the Rustless Iron and Steel Division of the American Rolling Mill Co., Baltimore, have been made public by G. D. Moomaw, general manager.

A development engineering department has been established and it is headed by Stanley P. Watkins, former manager of the market development department. Thomas L. Moore, who formerly was manager, western sales, has been named assistant manager.

Appointment of Peter B. Kline as assistant manager of stainless bar and wire sales also is announced. Kline formerly was manager, eastern sales.

George W. Clearwater has been elected assistant treasurer of American Rolling Mill Co., and has been named office manager of the Rustless Iron and Steel Division.

Buffalo Bolt Co. Incorporates Buffalo International Corp.

Buffalo Bolt Co. of North Tonawanda, N. Y., announces the incorporation of Buffalo International Corp. with J. C. Walker as president. A wholly owned subsidiary, Buffalo International Corp. will handle all overseas selling for the parent company and manufacturing subsidiaries. Headquarters for Buffalo International Corp. will be at 50 Church Street, New York City.

Two Rejoin Firm

Arnold and Harold Markus, recently released from the Army, have resumed their connection with Jackson Markus Trading Co. with headquarters in New York. Peter Markus, father of the two, operates the K. C. Pipe & Supply Co. in Tulsa.

International Harvester Names Motor-Truck Personnel

International Harvester Co., Chicago, has announced the following changes in branches and in branch management personnel. Separate motor truck branches have been established at San Antonio and Houston. T. R. Moulder, formerly assistant manager in charge of motor trucks, has been named manager at San Antonio. C. T. Helin has been similarly advanced from assistant manager in charge of motor trucks to manager at Houston. E. M. Moore, who has been retail motor truck manager, has been appointed assistant manager at Houston.

Other recent branch management changes announced by International Harvester are as follows:

M. J. Gowen, previously assistant manager at the Cincinnati motor truck branch, has been made manager of the Richmond motor truck branch. L. C. Carroll replaces Gowen as assistant manager at Cincinnati. C. V. Ellis, who has been assistant manager of the Topeka branch, has been transferred to the Kansas City motor truck branch in the same capacity.